Industrial QUALITY CONTROL

In This Issue—

A Better Way
—RAYMOND S. SADDORIS

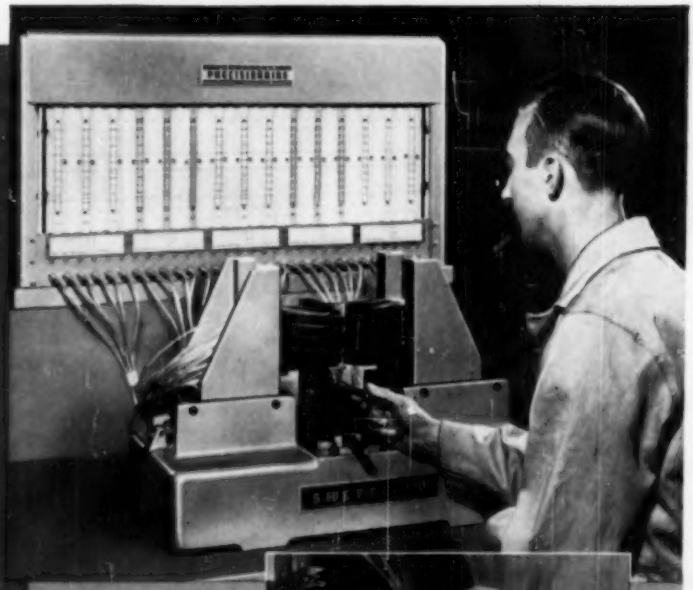
Chain Sampling Inspection Plan
—HAROLD F. DODGE

A Survey of the Use of Statistical Methods by ASQC Members in the Metals Industry
—FRANK G. NORRIS

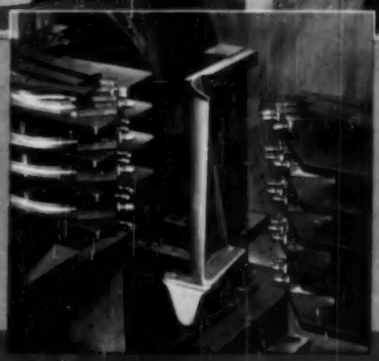
QUALITY
through
Scientific Methods

Journal of the
AMERICAN SOCIETY FOR QUALITY CONTROL

YOU CAN GAGE 40 or MORE DIMENSIONS *As Quickly* AS YOU CAN ONE



Checking 30 points on a jet engine blade



Gaging heads ready to approach the jet engine blade

Spectacular developments in AIR gaging are saving industry millions of dollars and thousands of man-hours. Here's how and why:

1. One operator with one gage can check up to 40 or more dimensions of each work part simultaneously and instantly. The number of parts per hour depends solely on how fast the inspector can handle them.

2. Precision is built into the gage—readings are unaffected by human skill, human judgment and human memory. It's not necessary to memorize and compare readings for individual dimensions—one quick panoramic glance at the float pattern ("Airechart") tells the whole story—the "Float Graph" shows the true condition of every critical dimension.

3. The position of each float shows just where the dimension is within tolerance limits or just how much above or below limit if it is out of tolerance. This is essential for Quality Control.

PHONE, WIRE or WRITE for the full story on how YOU can "produce more and better products at lower cost through practical precision"—in this case, multiple dimension inspection by Precisionaire gaging.

Gage Division — The Sheffield Corporation
Dayton 1, Ohio, U. S. A.

All main bearings of a tractor crankshaft are checked simultaneously

6757

MASTER CRAFTSMAN SHEFFIELD HEADQUARTERS

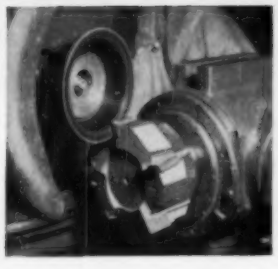
SHEFFIELD

On any carbide grinding job...

Nothing cuts like a Norton diamond wheel

Norton Vitrified Bonded Diamond Wheels outperform all others of this type. They combine the fast cutting action of resinoid bonded wheels with resistance to grooving approaching that of metal bonded wheels. Great durability is another advantage.

◀ ***Production Grinding of Single Point Carbide Tools*** is most economical and efficient with Norton vitrified bonded diamond wheels. Grinding chip breakers, as illustrated, is another important job for which they are ideal.



Norton Resinoid Bonded Diamond Wheels combine fast cutting with long, money-saving wheel life that makes them favorites for precision sharpening. Made in two bond types — regular, for wet grinding and B6, for dry grinding. It is always more economical to use each bond type on the applications for which it is best suited.

◀ ***On Your Multi-Tooth Grinding Jobs,*** Norton resinoid bonded wheels hold size so that each tooth gets uniform grinding. The straight, thin shapes make excellent cut-off wheels for salvaging damaged carbide tools.

Diamond wheels in carbide grinding more than pay for themselves. "It's like finding money."

You can cut grinding time — and grinding costs — to the lowest possible by standardizing on Norton diamond wheels.

As a result of Norton Company's long pioneering† in diamond wheel development, Norton diamond wheels bring you a combination of long service life and efficient cutting action that means maximum economy — across the entire range of carbide grinding applications.

Besides the vitrified and resinoid bonded types shown here, Norton diamond wheels are also available in a metal bond — where durability and resistance to grooving, rather than a fast rate of cut, are primary considerations. For every application the proper size and type of Norton wheels are available in a wide variety of grit sizes.

NOTE: For small-volume carbide grinding requirements, especially in single-point applications, Norton K Bond CRYSTOLON* *wheels are often the best investment. Their high stock removal rate and uniform performance assure quality grinding at lowest cost. And they are made in half-grade increments of hardness, enabling you to "pin-point" your specifications.*

See Your Norton Distributor

for aid in selecting the right Norton wheels for every grinding job. And ask him for the 142-page, illustrated booklet: "Grinding Carbide Tools." Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. Listed under "Grinding Wheels" in your classified phone directory. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

W-1581

Making better products...
to make other products better

NORTON

and its BEHR-MANNING division

NORTON: Abrasives • Grinding Wheels • Grinding Machines • Refractories
BEHR-MANNING: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

†First with resinoid bonded, first with metal bonded, first with vitrified bonded diamond wheels.

BRYANT No. 21 THREAD GAGE

You can inspect both internal and external threads rapidly and accurately on the Bryant No. 21 Thread Gage. Internal threads from 1/16" to 5" diameter and external threads from #8 to 5" diameter can be checked — eight to ten times faster than with conventional gaging methods. An attachment for checking squareness-of-face in relation to the axis of a thread is available. Write for descriptive literature on this and other Bryant Gages.

Bryant Gage Division, Box 620, Springfield, Vermont, U. S. A.

Division of Bryant Chucking Grinder Co.

Industrial Quality Control

Vol. XI JANUARY, 1955 No. 4

Table of Contents

Memorial To Raymond S. Saddoris 6, 7

ARTICLES

A Better Way
Raymond S. Saddoris 8

Chain Sampling Inspection Plan
Harold F. Dodge 10

A Survey of the Use of Statistical Methods by ASQC Members in the Metals Industry
Frank G. Norris 14

DEPARTMENTS

Bibliography
Joseph Movshin, Editor 18

Ninth Annual Convention Announcement 20, 21

Local Section News 30

American Society News 39

Classified Ads 40

Consulting Ads 40

Industrial Quality Control is published monthly by the American Society for Quality Control, Inc. Entered as second class matter September 18, 1950, at the Post Office at Milwaukee, Wisconsin. Yearly subscription $3.00; non-members $9.00. Office of publication, 161 W. Wisconsin Ave., Milwaukee 3, Wisconsin. Headquarters office, 50 Church Street, New York 7, N. Y.
When you move be sure to notify the Society headquarters office of your address change. Allow about seven weeks for the change to become effective.

Statement of the Ownership, Management, Circulation, Etc. Required by the Act of Congress of August 24, 1912, As Amended by the Acts of March 3, 1933, and July, 1946.

Of "Industrial Quality Control," published bi-monthly at Milwaukee, Wisconsin, for September, 1954.

1. The names and addresses of the publisher, editor, managing editor and business manager are: Publisher, American Society for Quality Control, Inc., 50 Church St., New York 7, N.Y.; Editor, Mason E. Wescott, Rutgers University, New Brunswick, New Jersey; Managing Editor, George R. Foster, 6123 Plankinton Bldg., 161 West Wisconsin Avenue, Milwaukee 3, Wisconsin; Business Manager, Raymond S. Saddoris, A. O. Smith Corporation, Milwaukee 1, Wisconsin.
2. The owner is: American Society for Quality Control, Inc., 50 Church St., New York 7, N.Y.
3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are: None.
4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

GEORGE R. FOSTER,
Managing Editor.

Sworn to and subscribed before me this 28th day of September, 1954.

LILA H. MEANY,
Notary Public.

(SEAL)
(My commission expires September 14, 1958.)

"RENDER UNTO CAESAR . . ."

This issue of IQC rather typifies the extremes of emotion into which life is so prone to lead us. The dramatists going back to Greek civilization aptly demonstrate the realism in their works by using as their symbol the masks of humor and tragedy, side by side. Propriety and our social codes require that we reserve for the proper times humor and dignity; life continually forces us to intermix humor and tragedy, dead seriousness and light-hearted gaiety. The infinite rate of change from one situation to another sometimes seems intolerable, but it is one we are continually called upon to make. One moment we chuckle over the pup chasing its tail in an unsuccessful attempt to latch onto it; the next we gasp in horror as the child playing nearby dashes unseeingly into the path of an oncoming car.

And since life forces us into this continual intermingling of conflicting emotional sequences, it is one of those things we need to learn to live with. Or putting it another way, Lincoln, during one of the lowest ebbs of the Civil War, opened one of his cabinet meetings by reading a few anecdotes from one of his favorite joke books. His cabinet was shocked at his apparent lack of taste and what they considered to be a waste of their valuable time, until he explained that it was most important to maintain a sense of humor even and especially during the most travailing times since only through a sense of humor could the human being maintain the perspective necessary to cope with his troubles.

And so in one breath we are business-like and point out with pride that this issue of IQC represents the beginning of a new era—with this issue we begin publication on a monthly schedule. In the next we must sadly record the passing of the Society's president, Ray Saddoris (pages 6 and 7).

These two comments are not as incongruous as might at first seem, because Ray as much as any other single individual strived tirelessly for the advancement of ASQC and the magazine. Our arrival at monthly publication is something for which he worked long and arduously. Although we cannot use his exact words, speaking on his behalf, may we usher in the era of monthly publications with a large fanfare.

The road behind is well pockmarked; the road ahead has its pitfalls and washouts. We will have more to say about these later; for the present we must heave a sigh that another hurdle has been cleared and knuckle down to those ahead. We sincerely hope that these efforts achieve the goals toward which they are aimed; (1) to continue the education of each member to the end that he is better equipped to practise quality control and (2) to demonstrate to industry the manifold benefits that can be realized from a plant-wide statistical quality control program. —GRF

Industrial Quality Control

Published Monthly
by the
AMERICAN SOCIETY FOR QUALITY CONTROL, Inc.

★ ★ ★ ★ ★

ASQC Publications Office
George R. Foster, *Managing Editor*
Room 6123 Plankinton Bldg.
161 W. Wisconsin Ave.
Milwaukee 3, Wis.

Advertising Representatives

Eastern: Bob Weston
6 East 39th Street
New York, N.Y.

Midwest: L. B. Hammond
30 North LaSalle Street
Chicago 2, Ill.

★ ★ ★ ★ ★

Society Headquarters Office
Room 563
50 Church Street
New York 7, N. Y.

★ ★ ★ ★ ★

INDUSTRIAL QUALITY CONTROL is published monthly, the new volume beginning with the July issue, and is mailed to all members of the Society as one of the privileges of membership.

Direct subscriptions to INDUSTRIAL QUALITY CONTROL are not accepted from individuals. However, subscriptions will be received from Libraries and like institutions at $9.00 per year. Remittances must be in United States funds and should be sent directly to the Executive Secretary of the Society.

Back issues, comprising Volumes I through X are available at $10.00 per volume, including the Index. Individual issues are $1.00 each.

Correspondence concerning institutional subscriptions, requests for back issues, and allied matters should be addressed to

C. E. Fisher, *Executive Secretary,*
American Society for Quality Control
Room 563
50 Church Street
New York 7, N. Y.

Make checks payable to:
American Society for Quality Control.

GENERAL INFORMATION ABOUT A. S. Q. C.

Society Officers

Paul A. Robert, *President*
International Business Machines Corp.
Endicott, N.Y.

Arthur Bender, Jr., *Vice President*
Delco Remy Div., GMC
Anderson, Ind.

Dorian Shainin, *Vice President*
Rath and Strong, Inc.
Boston, Mass.

Julian H. Toulouse, *Vice President*
Owens-Illinois Glass Company
Toledo, Ohio

C. E. Fisher, *Executive Secretary*
Bell Telephone Laboratories
New York, N. Y.

Leon Bass, *Treasurer*
General Electric Company
Cincinnati, Ohio

Alfred L. Davis, *Jr. Past President*
Rochester Institute of Technology
Rochester, N.Y.

★ ★ ★ ★ ★

Advisory Council

E. U. Condon, *Director of Research and Development,*
Corning Glass Works,
Corning, N. Y.

M. Herbert Eisenhart, *Chairman,*
Bausch & Lomb Optical Co.
Rochester, New York

Hermon F. Safford, *President,*
Ohio Rubber Co.,
Willoughby, Ohio

Walter A. Shewhart, *Technical Staff,*
Bell Telephone Laboratories, Inc.
Murray Hill, New Jersey

Charles Deere Wiman, *President,*
Deere & Co.,
Chicago, Illinois

Copyright 1955
by the
AMERICAN SOCIETY FOR QUALITY CONTROL, INC.
Printed in U.S.A.
All rights reserved

Neither this magazine nor any portion thereof may be copied or otherwise reproduced without written permission of the copyright owner.

Permission for reproduction of certain specific portions of the contents may be given upon request, with the understanding that due source credit will be accorded.

Statements and opinions given in articles and papers appearing in INDUSTRIAL QUALITY CONTROL are the expressions of contributors for which the Society assumes no responsibility.

Editorial correspondence and requests for copyright releases should be addressed to

Mason E. Wescott
Chairman, Editorial Board
University College,
Rutgers University
New Brunswick, N. J.

★ ★ ★ ★ ★

Editorial Board

Mason E. Wescott, ***Chairman***
Rutgers University

Charles A. Bicking
Office Chief of Ordnance

Paul C. Clifford *(on leave)*
Montclair State Teachers College

Charles R. Hicks *(acting member)*
Purdue University

Allen T. Craig
State University of Iowa

Acheson J. Duncan
Johns Hopkins University

Eugene L. Grant
Stanford University

Frank E. Grubbs
Aberdeen Proving Grounds

B. H. Lloyd
Canadian Industries, Ltd.

Paul S. Olmstead
Bell Telephone Laboratories, Inc.

Ellis R. Ott
Rutgers University

William R. Pabst, Jr.
Bureau of Ordnance, Department of the Navy

Warren R. Purcell
Rath and Strong

Harry G. Romig
International Telemeter Corp.

Leonard A. Seder
Consultant

John W. Tukey
Princeton University

W. J. Youden
National Bureau of Standards

★ ★ ★ ★ ★

Divisions of ASQC

Textile Division
Dame S. Hamby, *Chairman*
North Carolina State College
Raleigh, N. C.

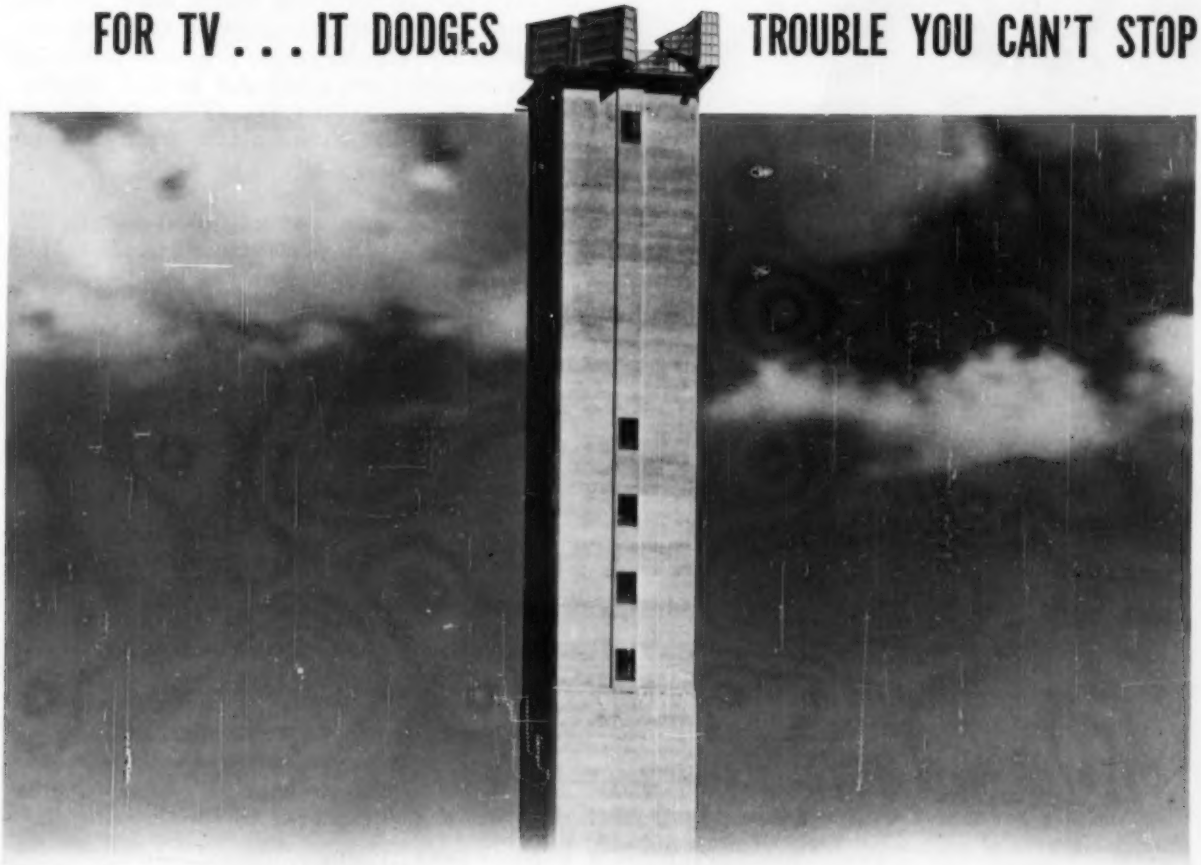
Chemical Division
Richard S. Bingham, Jr., *Chairman*
Atlas Powder Co.
Chattanooga, Tenn.

★ ★ ★ ★ ★

Membership in the American Society for Quality Control is available in three grades through local Sections or directly through the Executive Secretary. Annual dues for direct national membership are: for Members, $10.00; for Senior Members, and Fellows, $12.00. In each grade, $3.00 of the annual dues are allocated as a subscription to INDUSTRIAL QUALITY CONTROL. The Member grade is open to any person of good character who is 21 years of age and engaged or interested in quality control. Information covering higher grades of membership and concerning local Sections may be obtained from the Executive Secretary.

Membership in the Society is personal and professional, and is not open to corporations, companies, or other organizations.

FOR TV . . . IT DODGES TROUBLE YOU CAN'T STOP



Radio Relay station on route between Chicago, Ill., and Des Moines, Iowa. Every fifth or sixth relaying tower is a control station, where high-speed switching equipment enables a TV picture to skip out of a troubled channel and into a stand-by protection channel faster than the eye can wink.

There's no way to stop atmospheric changes that threaten television with "fade." But, for TV that travels over Bell's Radio Relay System, Bell Laboratories engineers have devised a way to sidestep Nature's interference.

When a fade threatens – usually before the viewer is aware – an electronic watchman sends a warning signal back by wire to a control station perhaps 200 miles away. An automatic switching mechanism promptly transfers the picture to a clear channel. The entire operation takes 1/500 of a second. When the fade ends, the picture is switched back to the original channel.

This is an important addition to the automatic alarm and maintenance system that guards Bell's Long Distance network for television and telephone calls. It marks a new advance in Bell Laboratories' microwave art, developed to make your Long Distance telephone service, and your TV pictures, better each year.

BELL TELEPHONE LABORATORIES

Improving telephone service for America provides careers for creative men in scientific and technical fields.

Raymond S. Saddoris

With an uncharacteristic dramatic suddenness Raymond S. Saddoris, director of quality for the A. O. Smith Corp. and president of the American Society for Quality Control, passed from the scene on Saturday, November 13, 1954. Those who knew him and worked with him in his company and the Society still feel a numbness over the suddenness of his passing. For Ray customarily did nothing until he had thought it out well beforehand and considered all the ramifications of his decisions, to the end that the most good would follow from his actions. Now, of a sudden, he is gone and we who remain behind find the English language wanting when we try to make it say what we feel.

In his 33 years with A. O. Smith, beginning on July 5, 1921, Ray Saddoris moved up through the ranks of various inspection and engineering posts. His efforts as supervisor of inspection for both the automotive and aeronautical divisions during the years of World War II culminated in his appointment as director of quality for the entire corporation on January 1, 1947. Because of his efforts the quality program at A. O. Smith moved steadily forward with the result that this company is now thoroughly quality conscious. The continuing challenge to find "A Better Way" found a ready response in Ray's thinking, and the marks of his effectiveness are residual in the seven-man quality control staff he left to carry on his work at A. O. Smith.

Ray possessed a rare quality of true leadership which was evidenced in his ability to inspire in his associates the desire to do the things he wanted them to do. He possessed this quality to a high degree. Coercion was never one of his tools, no matter how right he was in principle. Rather he operated through a quiet but convincing persuasiveness that gave his listener a sense of enthusiasm for the assignment and a feeling of personal obligation to see that it was carried out along the lines Ray outlined. Remove that kind of leadership from any organization and there remains a gap difficult to close.

Ray never thought on a small scale about anything that he set his mind to. He never made little plans. He had the courage to think big and the talent for infusing enthusiasm for big things in the people who worked with him. In his first year as president of the Milwaukee Section he startled us all by planning activities on a scale the likes of which we had only dreamed. When his tenure of office was over, we took such planning in our stride, for Ray in his own way was a teacher. He taught us by example that when anything was worth doing at all, it was worth doing with all your might; that if you searched for it diligently enough, you would find the "better way" of getting the job done.

Ray was an intensely loyal person, and so he could, without trying to, instill a loyalty to him in those who worked with him. It was said once about one of his staff, "A. O. Smith pays that man's salary, but he works for Ray Saddoris." That could have been said about many of us at A. O. Smith and in fact would apply to many of us in the Society. Ray would be the first to insist that he always had a lot of good capable help in his ventures, but without his long-range vision, clear insight and real leadership the "help" would have been hard put to achieve the calibre of success attained with Ray at the helm. And no one ever received a greater accolade than that expansive, heart-warming grin that Ray could bestow, and always did, when the job was done right.

Ray was born in Osceola, Iowa, on December 2, 1898 and was graduated from high school at Atlanta, Illinois, at the age of 16. His family then left Illinois, and in the following year, 1916, he enlisted in the Navy from Gooding, Idaho. In January 1920 Ray entered the Milwaukee School of Engineering but left to join the A. O. Smith Corp. on July 5, 1921. On July 7, 1923 he married Selma Schultz of Milwaukee.

Surviving him are his wife, Selma; his daughter, Mrs. Virginia Schmidt; and his son, Ronald, all of Milwaukee; also his mother, Mrs. Pearl Saddoris, and a sister, Mrs. Lorraine Brookshire, both of Nampa, Idaho. Masonic funeral services were conducted on November 15 with burial at Valhalla Cemetery in Milwaukee.

L S E

RESOLUTION

By the Officers and Board of Directors
of the

American Society for Quality Control
On the Death of

Raymond S. Saddoris

WHEREAS, it is with profound regret that we record the death on November 13, 1954, of Raymond S. Saddoris, Founding Member and Fellow of the American Society for Quality Control; and,

WHEREAS, he joined the Society on January 15, 1946, and faithfully served as President and National Director of the Milwaukee Section — July 1, 1948 through June 30, 1950; Midwest Regional Director — July 1, 1950 through June 30, 1952; General Chairman of the Society's 4th Annual Convention and 5th Midwest Conference — June 1 and 2, 1950; Chairman, Advertising Committee — July 1, 1949 through June 30, 1952; Business Manager, "Industrial Quality Control" and Vice President of the Society — July 1, 1952 through June 30, 1954; and

WHEREAS, on July 1, 1954 he assumed the office of President of the Society, to which office he brought an unusual understanding of Society problems, and for a few short months discharged the duties of this office with dignity, sincerity, and humility; and

WHEREAS, through his many years of devoted service he became widely and affectionately known, and whose memory is a worthy inspiration for all members of the Society; therefore, be it

RESOLVED, that in behalf of the entire membership of the American Society for Quality Control, the Officers and Board of Directors express their feeling of great loss, and extend to Mrs. Saddoris their heartfelt sympathy; and be it further

RESOLVED, that this resolution be recorded in the permanent minutes of the Society, that it be published in "Industrial Quality Control", and a copy be transmitted to the family.

December 15, 1954

A Better Way

RAYMOND S. SADDORIS
A. O. Smith Corp., Milwaukee, Wis.

"Whether an idea was born yesterday or whether it is 100 years old is of little importance. Either it has the stuff of permanence or it has not. To be lasting, the idea must rest on the bedrock of what men have found to be fact; it must be based on what is true. Yet that is not enough. The idea must be useful to many people; it must serve purposes outside of itself; it must be of ever greater service as it grows. Only thus can an idea achieve permanence.

"The life of the world depends on this simple concept. The laws of nature testify to it. The institutions that man has built—religious, political, scientific, economic—illustrate man's struggle to move forward, constantly to seek A Better Way, within the framework of ideas that are true and useful and capable of growth."*

We believe that quality control is just such an idea. It is based on facts and will be lasting. It is useful to many people; it does serve purposes outside of itself; and it will achieve permanence.

I should like to recall some statements made to this group during the past, and then add some thoughts of my own. At the Milwaukee Industrial Clinic, Mr. John S. Randall, division manager, Automotive Group, A. O. Smith Corp. stated on Oct. 20, 1954:

"Your product is a wonderful and awesome thing and as such it is hard to sell. But like any other product, it is worthless sitting on your shelves. You know and I know that industry needs product, but need alone does not sell. I say to you as a sales manager says to his salesmen—Get off your professional seats of learning—Simplify—and Sell."

About three years ago Mr. Charles E. Heitman, assistant general manager at A. O. Smith spoke before the Milwaukee Section, and he summed up his talk with the following words:

"Now in conclusion, I would like to say that statistical quality control is an effective management tool, which sooner or later all managers must use. With a good product and a customer who needs it, why then hasn't it gained even greater acceptance? The answer seems to be that an inferior job of selling has been done. The responsibility for this lies not only with the SQC man but with the manager as well. By de-emphasizing the 'how it works' approach and re-emphasizing the 'what it does for you' approach, we will find at least a partial answer to the problem of more effective use of this tool."

On June 2, 1950 on the occasion of the Fourth Annual ASQC Convention and Fifth Midwest Quality Control Conference held in Milwaukee, Mr. Lewis D. Crusoe, vice president and general manager of the Ford Motor Company stated:

"I don't know of any problem to which management is giving more serious and intelligent consideration today than that of quality control. All of us know that, in the post-war rush to re-establish production, quality was too often the tail of the kite instead of leading the parade. The good merchandiser is fully aware that there can be no compromise on quality, that the American consumer demands and will get quality merchandise or he will not continue to buy.

"Under these circumstances, it is not surprising that there has been such great progress in the development and application of quality control systems to a wide variety of manufacturing and other processes. When you consider that, only a few years ago, quality control was a relatively unexplored and unorganized field, the list of topics for your clinical sessions becomes all the more impressive."

"However, I hope this doesn't mean the development of a new and inscrutable language that will narrow quality control to a field for technicians. If we agree that quality must be the concern and the goal of everyone on the production team, then I think we must deal in plain, clear terms that will have meaning even for the man who sweeps up the floor between shifts."

I think that these gentlemen were trying to tell us that quality control is really something out of the ordinary, that it is definitely needed, and that it will grow. I think also that they were trying to warn us against trying to keep quality control within the narrow limits of product quality, and that we must consider quality improvement as a very important function but only one of the many facets of a business which needs to be more closely related. I also think that they were trying to tell us, although they did not specifically say so, that we are most likely to succeed as a member of the business team rather than as an individual unit.

*These are the opening paragraphs of the booklet, *A Better Way*, prepared and published by A. O. Smith Corp., Milwaukee.

This paper was prepared by Ray Saddoris for presentation at the meeting of the Milwaukee Section, ASQC, scheduled for Nov. 15, 1954. The meeting was postponed to Nov. 22, at which time the paper was presented to the section by Les Eichelberger, assistant to the director of quality, A. O. Smith Corp., Milwaukee.

It is with sincere pride and affection that *Industrial Quality Control* extends this message to all its readers. The paper is both a fitting bequest and a timely challenge to the Society. In it is expressed in simple, forthright language the core of the philosophy that characterized Ray's vision and capacity for leadership in the field of statistical quality control.

It is altogether fitting that the Society should preserve in the permanent record of its literature this unique tribute to the man who prepared such a message and to take renewed affirmation to the theme so eloquently expressed in its title.

Mason E. Westcott

I feel that we should again ask ourselves "Just what are we trying to accomplish?" There are certain factors governing the motivation of the individual, group, or organization. First, there must be a definite objective and that objective must be thoroughly understood. Second, there must be a plan of operation in order to obtain results leading to the attainment of the objective, and third, there must be a registration of facts showing that progress is being made.

Quality control has made tremendous strides. It is an accepted way of doing business, but I find that we have probably devoted too much attention to the third point and have been so engrossed in registering facts and developing information that we have not taken the time to think out our objectives and to establish a plan of operation for attaining that objective.

I should like to tell you about some of the things we have done at A. O. Smith to set up an objective and to establish the plan for attaining it. Many companies have done similar things, but I do not know them as well, and I therefore hope you will forgive me for talking about my own company.

We have been working with quality control, statistical quality control that is, since October, 1946. At that time very few people, in our company at least, had any definite ideas about the subject. Today there is not a supervisor who has not had some instruction, and in some of our plants, all of our people have had some training. Looking backwards, we have made progress. We have had the approval and encouragement from top management from the beginning. Without that we would have been lost, but we have not been satisfied with the progress that has been made. We have not received all of the benefits that we told ourselves and others we would receive. The demands made upon us by our customers for quality improvement has just about kept pace with our progress. About a year ago our vice president and general manager called together members of his staff representing sales, manufacturing, public relations and education and training, cost, and quality control and said in effect, "Let's think seriously of this quality problem. Let us state an objective and do some planning, and that planning should go beyond the control of product quality and should take into consideration our reputation for quality, delivery, service, and performance; in fact, every phase of our activity which reflects the true character of our company. Every employee of the company should be made a part of the program and every means at our command should be used."

Following this meeting, we finally settled upon the theme "Satisfied Customers Keep Us In Business" and began the development of a program which would reach every employee of the corporation and—

1. Instill the concept of Satisfied Customers Keep Us In Business.
2. Develop an understanding of the company's need to be more competitive.
3. Build a greater realization of the fact that each employee's individual security and the company's ability to be competitive are closely related.
4. Re-establish the philosophy of A Better Way.

All of these things to be accomplished through:

Better Quality
Lower Costs
Greater Dependability

Two areas of activity were identified and agreed upon.

1. Psychological area—develop, instill, revitalize, generate the feel for and pride in quality throughout the company.
2. The action area—Develop a quality control program which will give action through the psychological area.

Within 90 days from the first meeting, a full blown program was presented to all of the Division Managers of our company, assembled in Milwaukee for that purpose. Three distinct and separate series of banners and posters were developed, one each emphasizing Quality, Cost, and Dependability, and each designed to tie in with the overall objectives of the program, an occasion for bringing to light problems that affected quality in the manufacturing areas and eminating from the production people themselves, was presented. Following the kick-off meeting with the managers, a tight schedule was set up and the same program was presented to each of the divisions. Meetings were held with all supervisors and they in turn held meetings with their departmental personnel. Procedures for handling quality improvement suggestions and for reporting activities on the suggestions upwards through management were set up.

This program was received with a great deal of enthusiasm. It proved that everyone wants to do a good job and will help if we can but get the problems to them. Results have been most encouraging.

But—it was too big a job for a staff group to handle. They could not be spread thin enough to give attention to the many smaller programs that were started in our divisions which are scattered from New Jersey to California and from Milwaukee to Houston. We had made one serious mistake. Really it was not a mistake because it was recognized at the inception of the program, but there was too little time to do all that we should have done. I feel that if we were to start over again, we would probably do the same thing. We simply prepared a program, presented it to the divisions, and then went into their divisions and presented it to their people. We had not received their counsel; we had not put the job of developing the program in their divisions up to them. We are about to enter into the second year of the program. It will follow the same general lines and have the same objectives as before, but it will be greatly strengthened by the active participation of division management and of division personnel. I have talked a great deal about a program which is quite broad and now I would like to refer back to my opening remarks and see how they fit in with what I have just told you about the Satisfied Customer program.

I quoted three people. Each of them indicated that we as a group needed to do a better job of selling a product for which there is a very definite need. I further interpreted their remarks to indicate that we need to widen our horizon; that it is necessary for us to become team members rather than individualists. I believe that we of A. O. Smith have made greater advances along the road to quality improvement during the past year than during the six previous years combined, and the reason is that we have made 15,000 people aware of the quality problem who have done some thinking about it and who have taken some action on it instead of the few hundred that we had in the quality control departments. I feel confident that greater improvement will be made during the next year, as the effectiveness of our objectives is realized. More important than the material elements of the business, are the people and the conditions under which they work. Our objectives will be attained if our people gain the opportunity and the responsibility for assisting in their attainment.

Chain Sampling Inspection Plan*

H. F. DODGE

Bell Telephone Laboratories, Inc.

This article describes a special type of sampling inspection plan called the "Chain Sampling Plan ChSP-1" which has been found useful under certain conditions for application to product characteristics involving destructive or costly tests.

When sampling plans are set up for product characteristics that involve destructive or costly tests, more often than not a "small-sample" plan is chosen as a matter of practical expediency. For inspection by the method of attributes, a commonly used sampling plan is one involving a single small sample such as 5, 10 or 15 units or specimens and allowing zero defects in the sample (acceptance number, c = 0).

As used for acceptance inspection, single sampling plans with c = 0 have certain undesirable characteristics:

(a) A single defect in the sample calls for rejection of the lot (or for classification of the lot as nonconforming), and

(b) The operating characteristic curve (OC curve) of all such sampling plans have a uniquely poor shape, in that the probability of acceptance starts to drop rapidly for the smallest values of percent defective (see Fig. 1).

In contrast, single sampling plans having c = 1 or more, as well as double and multiple sampling plans, lack these undesirable characteristics. For these other plans, rejection rests on finding at least two defects and the OC curves are convex upward at the start as indicated in the right-hand diagram of Fig. 1. The question arises whether anything can be done to improve upon the c = 0 plans without increasing the number of articles or specimens to be tested per lot. There appear definitely to be cases where this limitation of sample size per lot is very real.

The sampling plan to be described overcomes to a degree the shortcomings mentioned above, by making use of the cumulative results for several samples. Such use of cumulative results would appear appropriate under perhaps somewhat limited conditions. It is proposed here for application to cases where there is repetitive production under the same essential conditions and where the lots or batches of product to be samples are offered for acceptance in substantially the order of their production. Such situations may arise in receiving inspections of continuing supplies of purchased materials or in interdepartment inspections of materials produced within a manufacturing plant. The plan is not considered suited to intermittent or job-lot production nor to occasional purchases.

*Presented on the program of the Annual Middle Atlantic Regional Conference, ASQC, Baltimore, Md., Feb. 5, 1954.

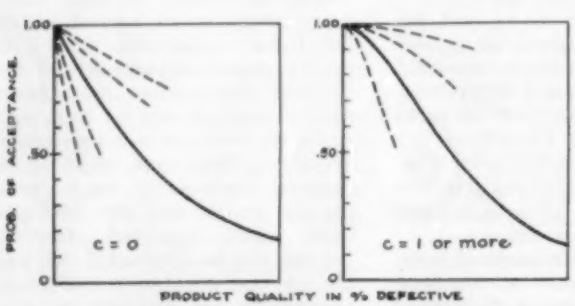


Figure 1—General Shape of OC Curves, Single Sampling Plans

Suppose we consider such a situation with a continuing supply of some processed material, such as a particular type of copper-alloy rod or sheet. Say that a single sampling plan n = 5, c= 0 is being used for tensile strength. For each lot, five standard specimens are prepared and subjected to a standard test. If all five tests meet specification, the lot is accepted. If one of the five specimen tests fails to meet specification (i.e., one defect is observed), then the lot is considered nonconforming under the sampling plan and is subject to rejection or other disposition.

At this point certain questions arise. If the immediately preceding lot, or one of the most recently submitted lots, was also found nonconforming, then it would be reasonable to consider the current lot and perhaps the whole run of recent product to be of doubtful quality and hence probably subject to rejection. On the other hand, if no tensile test failures had been observed in the samples for quite a number of preceding lots, one might reason as follows: "We can't expect perfection. A small percentage of marginal failures to meet specification is reasonable for most such products. And if some small percent defective is reasonable, this one defect that we have just observed is probably that occasional one that we must expect every now and then." Now if the current defect were in fact the occasional defect, the lot should be accepted. To be able to act as though the observed defect is merely the occasional one requires several things:

(a) the lot should be one of a series in a continuing supply as mentioned above,

(b) lots should normally be expected to be of essentially of the same quality,

(c) the consumer should have no reason for believing that this particular lot is poorer than the immediately preceding ones, and

(d) the consumer must have confidence in the supplier, confidence that the supplier would not take advantage of a good record to slip in a bad lot now and then when it would have the best chance of acceptance.

It remains then to set up the details of a plan for use under these conditions. Since each lot is to be considered as one of a series, and sample results are to be used cumulatively for acceptance purposes, the whole procedure is viewed as a series of associated operations. Individual lots and individual samples are like links in a chain; in specific instances acceptance is based on the sampling results in several links of the chain. For this

reason the general plan is referred to as a "chain sampling plan;" the designation ChSP-1 refers to this particular plan to distinguish it from other chain sampling plans.

Chain Sampling Plan ChSP-1

1. *Conditions for Application*
   (a) Interest centers on an individual quality characteristic that involves destructive or costly tests, such that normally only a small number of tests per lot can be justified.
   (b) The product to be inspected comprises a series of successive lots (of material or of individual units) produced by an essentially continuing process.
   (c) Under normal conditions the lots are expected to be of essentially the same quality (expressed in percent defective).

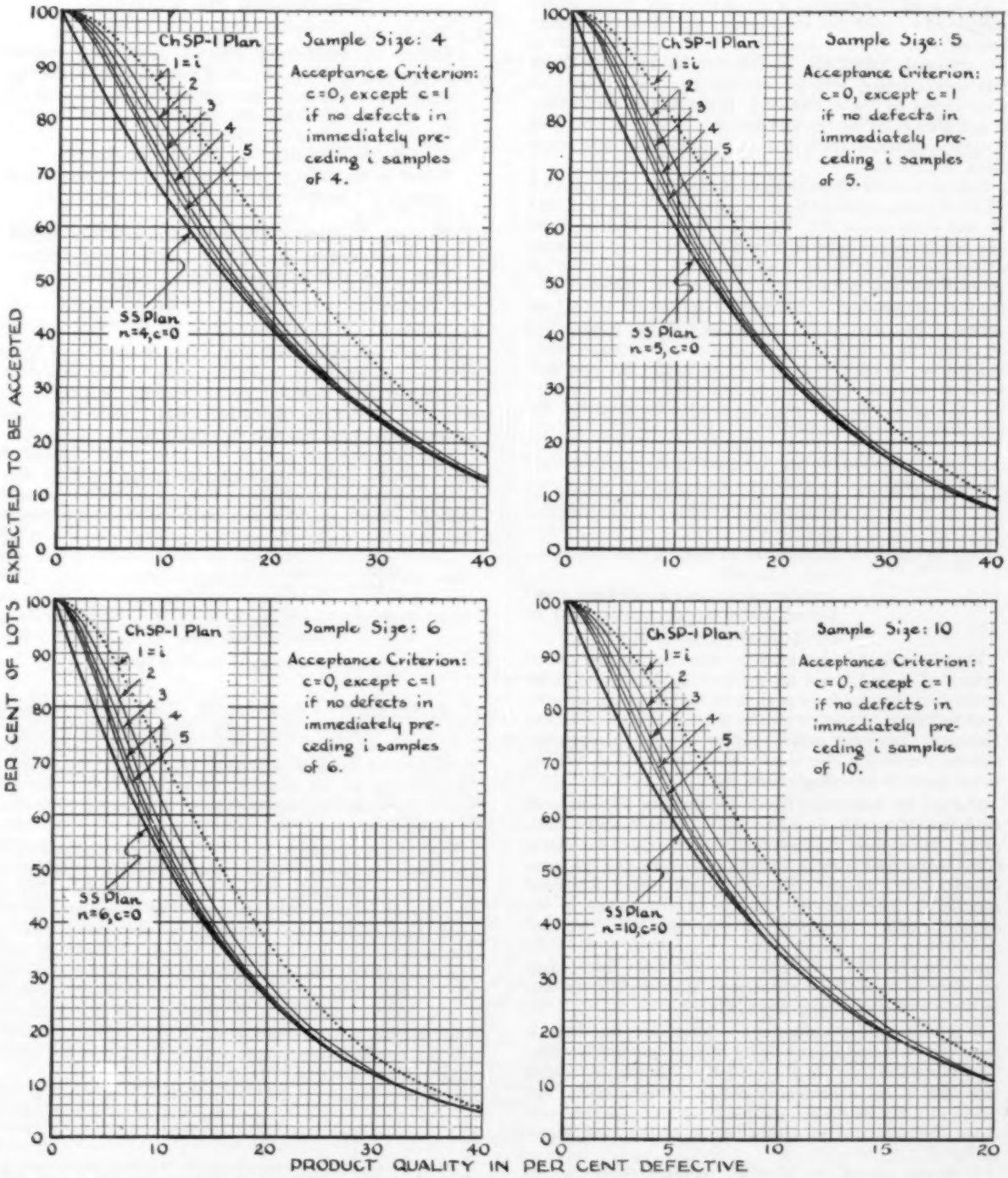


Figure 2—OC Curves for ChSP-1 Plans with Values of i from 1 to 5. For comparison single sampling plans (n = 4, 5, 6 and 10, with c = 0) are shown.

(d) The product comes from a source in which the consumer has confidence.

2. *Procedure*

(a) For each lot, select a sample of n units (or specimens) and test each unit for conformance to the specified requirement.

(b) Acceptance number of defects, c = 0; except c = 1 if no defects are found in the immediately preceding i samples of n. (i = 1, 2, 3 . . .)

Thus a lot is accepted if no defects are found in its sample of n units (or specimens). A lot is rejected if two or more defects are found in its sample. But if one defect is found, the lot can still be accepted if the last defect found was far enough back in history, as determined by the choice of i. If i = 4, the current lot is accepted even though one defect is observed, provided that the samples from the four preceding lots were clear of defects.

Figure 2 gives characteristic curves for four sets of ChSP-1 plans, with normal samples of n = 4, 5, 6 and 10, and with values of 1 = 1, 2, 3, 4, and 5. Each of these curves shows for a given n and given i, the percentage of lots expected to be accepted for a given value of product quality p (say p = 0.02, or two percent defective) is meant the conceptual unlimited output or series of lots from a process for which the probability of producing a defect is p. Thus the curves show what is expected to happen over a series of lots for a named level of percent defective. As indicated in the Appendix, the proportion of lots expected to be accepted for any given product quality (p), is given by

$$P_{acc} = P_{0,n} + P_{1,n}\,(P_{0,n})^i$$

where $P_{0,n}$ = probability of finding no defects in a sample of n units from product of quality p,

$P_{1,n}$ = probability of finding one defect, in such a sample,

i = number of preceding samples, mentioned above in paragraph 2(b) of the procedure for ChSP-1.

This formula can be used for drawing up curves for values of n and i not shown in Fig. 2. It should be noted that, due to the cumulative nature of the acceptance criterion, these curves have a somewhat different meaning than the usual "probability of acceptance" curves (operating characteristic or OC curves) for the usual types of sampling plans.

Curves for individual ChSP-1 plans can be compared with the OC curves for basic c = 0 plans of single sampling. It is seen that adding the provision for using cumulative results for i preceding samples has the same effect on the characteristic curve as taking a second sample. It increases the chances of acceptance in the region of principal interest—where the product percent defective is very small. Since in addition it calls for rejection provided only that two defects are fairly close together, it modifies the basically undesirable features of the c = 0 single sampling plans.

It is believed that values of i = 3 or more, say three to five, will be found most helpful in practical applications. The curve for i = 1 is shown dotted, merely to suggest that this is not a preferred choice. Theoretically, any value of i can be used—one has only to make the indicated computations to obtain curves of the kind shown in Fig. 2.

With the use of this plan for measurable characteristics, for example, tensile strength and elongation of a material, it will normally be useful to keep a running chart of the measured values to provide supplementary information on the distribution of quality. Among other things, a continuing time-plot or control chart of measured values helps to identify wild points and is of assistance in problems of determining whether troubles are measurement troubles or product troubles.

The Appendix gives the mathematical relations involved in the Chain Sampling Plan ChSP-1.

Mathematical Appendix: Mathematical Relations for Chain Sampling Plan ChSP-1

1. *The Problem*

Given: A continuing process producing product comprising a series of lots. From each lot a random sample of n (units or specimens) is selected, and the lot is accepted if the sample results meet the following acceptance criterion:

Acceptance Criterion: c = 0 defects, except c = 1 defect if no defects are found in the immediately preceding i samples of n.

(i = 1, 2, 3, . . .)

To Find: The proportion of lots that will be accepted, for a product of quality level (fraction defective) equal to p; that is, product from a process for which the probability of producing a defect is p.

2. *Solution*

The solution makes use of the theory developed for a published continuous sampling plan,* with attention directed to the random order spacing of "defective *samples*" instead of "defective *units*," when sampling from a universe of fraction defective, p.

If samples are arranged in the order of production of the lots which they represent (see Fig. 3), then defective samples (those having one or more defects) will have an order spacing which can be expressed in terms

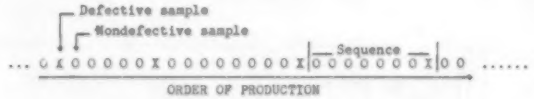


Figure 3—Spacing of Defective Samples

of certain probability laws. The entire array of Fig. 3 can be considered as a succession of "sequences of i + 1 samples, each sequence comprising i successive nondefective samples followed by a defective sample. The totality of all possible such sequences, where i varies from zero to ∞, constitutes a universe of events to be considered.

Each such sequence of i + 1 samples, comprising i successive nondefective samples followed by a defective one, has a definite probability of occurrence, for a process of fraction defective, p. The complete set of such probabilities for all possible sequences, having respectively i = 0, 1, 2, 3, . . . , defines a probability distribution of random order spacing of defective samples. This is shown in the table below in which 0 represents a nondefective sample, X represents a defective sample (one having one or more defects), $P_{0,n}$ is the probability of a nondefective sample, and $P_{1\text{ or more},n}$ is the probability of a defective sample,

where $P_{0,n} = (1-p)^n$ = probability of finding no defects in a sample of n

*H. F. Dodge, "A Sampling Inspection Plan for Continuous Production", *Annals of Mathematical Statistics*, Vol. XIV, 3, Sept. 1943. Reprinted in B.T.L. Monograph 1834. There, successive units are used instead of successive samples and random order spacing of defective units is used instead of random order spacing of defective samples.

units (or specimens) from product of fraction defective, p,

$P_{1 \text{ or more, } n} = 1 - P_{0,n}$ = probability of finding one or more defects in a sample of n units product of fraction defective, p.

Sequence	Spacing of Defective Samples (No. of Samples in Sequence)	No. of Nondefective Samples in Sequence	Probability of Occurrence	No. of Term in the Power Series
X	1	0	$P_{1 \text{ or more, } n}$	1st
0X	2	1	$P_{1 \text{ or more, } n} (P_{0, n})$	2nd
00X	3	2	$P_{1 \text{ or more, } n} (P_{0, n})^2$	3rd
000X	4	3	$P_{1 \text{ or more, } n} (P_{0, n})^3$	4th
0000X	5	4	$P_{1 \text{ or more, } n} (P_{0, n})^4$	5th
..	..	..	..	..
..	..	..	..	..
..	..	..	..	..
..	..	..	..	..
000..0X	i+1	i	$P_{1 \text{ or more, } n} (P_{0, n})^i$	(i+1)st
..	..	..	..	..
..	..	..	..	..

These probabilities are the successive terms in the infinite series

$$P_{1 \text{ or more, } n} [1 + P_{0, n} + (P_{0, n})^2 + (P_{0, n})^3 + \ldots .] \quad (1)$$

The sum of this series is $P_{1 \text{ or more, } n} \left(\frac{1}{1 - P_{0, n}} \right) = 1$, that is, the total probabilities for all possible sequences is unity, as it should be.

Each defective sample is the terminal sample in a sequence, 0 0 0 0 0 X. Some defective samples will have one defect, some will have two or more defects. Under the conditions of the sampling procedure, some of the one-defect samples will be acceptable, but the remaining one-defect samples and all two-or-more defect samples will be nonacceptable. Specifically, the proportion of all defective samples that will be acceptable is equal to the proportion of sequences in which:

(A) the terminal (defective) sample is a one-defect sample, preceded by i or more nondefective samples.

The proportion of all samples that will be acceptable is

$$P_{acc} = P_{0, n} + P_{1 \text{ or more, } n} \text{ [proportion of all sequences satisfying (A)]} \quad (2)$$

It remains to find the proportion expressed in brackets.

As given above, the sum of probabilities for all sequences is

$$P_{1 \text{ or more, } n} [1 + P_{0, n} + (P_{0, n})^2 + (P_{0, n})^3 + \ldots .]$$

which can be broken up into three parts:

(a) $P_{1, n} [1 + P_{0, n} + (P_{0, n})^2 + \ldots . (P_{0, n})^{i-1}]$ (nonacceptable)

(b) $+P_{1, n} [(P_{0, n})^i + (P_{0, n})^{i+1} + \ldots .]$ (acceptable)

(c) $+P_{2 \text{ or more, } n} [1 + P_{0, n} + (P_{0, n})^2 + \ldots .]$ (nonacceptable)

Of these, only (b) will result in acceptance, hence we want the proportion $\frac{(b)}{(a)+(b)+(c)}$, which is equal to (b), since (a) + (b) + (c) = 1. The proportion (b) can be arranged to give:

$$(b) = P_{1, n} (P_{0, n})^i [1 + P_{0, n} + (P_{0, n})^2 + \ldots .]$$

$$= P_{1, n} (P_{0, n})^i \left(\frac{1}{1 - P_{0, n}} \right) \quad (3)$$

Therefore the proportion of all samples that will be acceptable, or expressed another way, the proportion of presented lots that will be accepted, is:

$$P_{acc} = P_{0, n} + P_{1 \text{ or more, } n} (P_{1, n}) (P_{0, n})^i \left(\frac{1}{1 - P_{0, n}} \right).$$

Then, since $P_{1 \text{ or more, } n} = 1 - P_{0, n}$,

$$P_{acc} = P_{0, n} + P_{1, n} (P_{0, n})^i \quad (4)$$

Note on "Application of Statistical Techniques to Standardization of Industrial Products," by Charles A. Bicking, Sept. 1954, IQC.

Recent Navy Ordnance standard sampling plans were incorrectly described in the section on use of statistical standards by the Armed Forces. NAVORD Std. 80 covers a variables sampling plan applicable when the population standard deviation is not known and is not, as stated in the paper, based on the range. The reference to NAVORD Std. 81 is incorrect also because this standard concerns sampling for attributes on a moving line.

The new military standard for inspection by variables, "MIL. STD.—Sampling Procedures and Tables for Inspection by Variables for Percent Defective," is now in process of being approved by the military departments and it is expected that it will be formally issued early in 1955.

SHEWHART MEDAL NOMINATIONS

The Shewhart Medal Committee announces the opening of nominations for the 1954 Shewhart Medal which, in accordance with the policy established by the Board of Directors of the Society, may be awarded at the Annual Convention of the Society in New York in May 1955.

This award is intended to honor that individual who has made the most outstanding contributions to the science and techniques of quality control, or who has demonstrated outstanding leadership in the field of modern quality control.

Nominations may be made by individual members, groups of members, or by Sections. Membership in the Society is not a requirement and it is desirable that nominations not be made solely on a sectional basis.

The closing date for nominations is January 31, 1955, but it is urged that nominations be made promptly to facilitate work of the committee. The names of nominees should be sent to the chairman of the Shewhart Medal Committee:

Major General Leslie E. Simon
Office, Chief of Ordnance
Washington 25, D.C.

A Survey of the Use of Statistical Methods by ASQC Members in the Metals Industry*

Metals Technical Committee

FRANK G. NORRIS
Chairman, Sub-Committee on Survey

"Every man thinks that his own geese are swans"

The sponsors of any survey are more than commonly egoistical. We begin our effort with the assumption of a right to ask questions that, except for the grand level of the endeavor, could be regarded as mere nibbiness.

Our only hope of success is to offer some form of reward to the participants. In the present survey we had a purpose that was clearly stated in hopes of enlisting the self interest of the participants. We further stated that those who made the survey possible by providing information would participate in the results by receiving a report.

The egoism of the sponsors is further shown in the report of the results. There is a tendency to neglect the bias that is present, to generalize from limited data, and to assume a wisdom that is unjustified. Having warned the reader to proceed with caution we shall attempt, at least partially, to remove the need for such warning.

Results of the Survey

The primary purpose of this survey was to provide information for use of the Metals Technical Committee in the preparation of case histories describing applications of various statistical methods. The survey was planned to indicate the need or demand for further information regarding the use of statistical methods; and also to indicate sources of supply for the preparation of case histories by those who are currently using the various methods. This primary objective has been met and the committee is making use of the information and proceeding with plans for the preparation of case histories.

In addition to the primary purpose mentioned above the survey had two secondary results: (1) The process of circulating the questionnaire has stimulated interest in the use of various statistical methods; (2) A related result is the attendant publicity given to the work of the Metals Technical Committee and to the ASQC in general.

Selection of Methods

Considerable attention and group effort was given by the committee to the selection of the methods included in the survey. The intent was that the list should be representative of a wide range of various types of methods rather than attempting to make an all inclusive list. Sufficient elementary or rather simple methods were included so that everyone would find in the list at least a few methods in current use. Other methods were selected as representative of the newer or less known methods so that the list would be broad enough that no one would be likely to be using all of the methods in the list. These two objectives were quite well accomplished. There is no claim on the part of the committee that the present list of methods is the best that could be selected for a survey of this kind. In fact it becomes rather difficult to decide a basis of comparing one list of methods with another for this purpose. Should the survey be extended, it is suggested that the same list of methods be used in order to offer a better basis of comparison of the results of the two surveys.

Possible Future Surveys

Some consideration has been given to the extension of the survey in order to discover the extent of need for the more elementary methods. It is recognized that the present survey was biased by some of the factors discussed below that contributed to the good response, such as membership in ASQC, and above average experience and knowledge in the application of statistical methods. It is also felt that there may be a need to extend this survey to discover the use and need for the methods that are particularly adapted for use by research organizations.

The present survey was by companies. One questionnaire was sent to the highest official in each company in the metals industry represented by membership in ASQC. Several possible extensions of the survey have been considered:

1. to survey by individuals rather than by companies
2. to survey other companies in the Metals Industry
3. to survey ASQC members either as individuals or by companies in other than the metals industry

Such extensions would involve a very much larger mailing list than that used for the present survey. The use of a sampling scheme is a method commonly used in order to secure valid information from a smaller distribution of questionnaires. This possibility has been considered by the committee and tentatively rejected because of the great educational value in publicizing the work of the committee and in stimulating the interest in the use of statistical methods that is offered by extending the survey using a large mailing list. In order to secure interest and to give a sense of participation, a report of the present survey will be sent with the questionnaire.

Returns

The response to the present survey was exceptionally high: 76 re-

*This paper is based on a more extended report under the same title that was read at the Eighth Annual Convention held in St. Louis, June 19th, 1954 and is reported in full in Quality Control Convention Papers 1954, pages 579 to 616. A limited number of reprints of the complete report is available on request to those who did not attend the Convention. Send request to Frank G. Norris, Wheeling Steel Corporation, Steubenville, Ohio.

.000001" Accuracy*

Webber presents the most accurate Gage Block in the world . . .

the NEW Laboratory Master

Technical Information

Parallelism—across width	.000001"
—along length	.000001"
Flatness—across width	.000001"
—along length	.000002"
Deviation from marked size	±.000002"
Calibration by Interferometry	±.0000002"
Accuracy of Calibration	±.0000008"
Coefficient of expansion, per 1° F. per inch	4×10^{-6}

Surface Finish . . . by optical comparison, equal to a quartz flat.
Corrosion resistance—approx. 10 times that of 18-8 Stainless Steel
Material—Chrome Carbide

*Certified

Webber GAGE COMPANY

12907 Triskett Road • Cleveland 11, Ohio

Webber MICRO-ACCURATE Gages

Largest Exclusive Manufacturers of Precision Gage Blocks

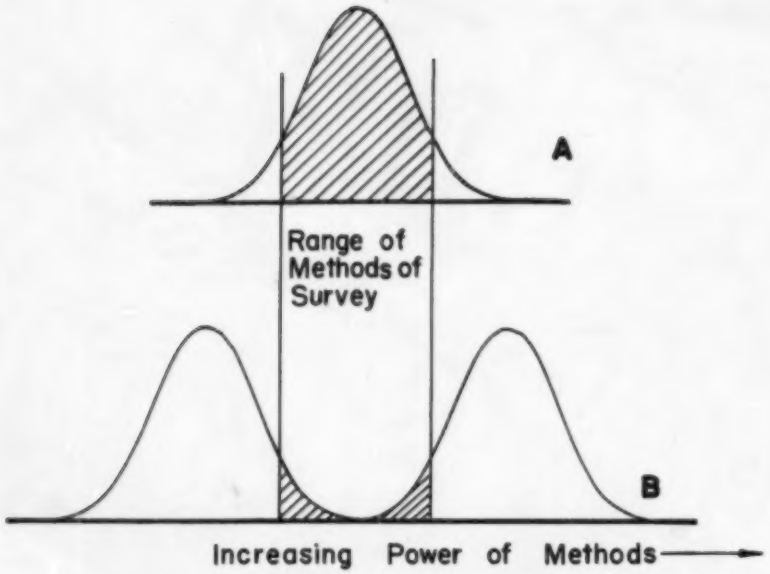


Figure 1—Schematic Representation of Interests of Metals Industry A. Survey well matched to interests. B. Survey poorly matched to interests.

plies were received from 103 questionnaires. This good response was, of course, in part because of the initial contact or common interest established by membership in ASQC of those receiving the questionnaire. Another factor contributing to the good response was the promise that the respondent would participate in the results and would receive a copy of the combined reply. Assurance also was given that individual replies would be regarded as strictly confidential.

In general comments on the results of the survey and on the selection of methods have been of two types namely:

1. The methods selected are too elementary and do not give proper weight or importance to newly developed methods which are very useful, and
2. The survey includes too many advanced methods and does not make proper provision for the simple methods that are easily and widely used.

These two contradictory comments give some assurance that the present list represents about the proper balance between two extremes of a single pattern of interest. This conclusion is based on the assumption of a distribution about as shown in Fig. 1a. It is recognized, however, that these comments might be the result of a situation as represented in Fig. 1b, in which there are two distinct patterns of interest. In this case the present survey may not meet either interest very satisfactorily.

Information Furnished by the Survey

The questionnaire requested a classification of the methods into two main groups: methods that are being used, and methods that are not being used. The methods that are being used were further classified according to whether the use was for routine reports or for only occasional reports. The methods that were not being used were classified according to the reason for not using them as follows:

Do not know about
Would like to know more about
Does not fit our needs
Has been discontinued
Plan to use if needed

The difficulty of securing uniform interpretation of these various replies is recognized. It is also realized that the most used method is not necessarily the most useful method. Many of the methods that are not used at present because they are not well known may in fact prove to be very useful methods if they were better known and more widely used. It is also possible that an individual may be of the opinion that a method does not fit his needs simply because of unfamiliarity with the possibilities of that method.

The methods of the questionnaire have been rather arbitrarily grouped into the six categories shown in Table I and Fig. 2. An index of use has been computed that is intended to show the extent of use (both routine and occasional) for each of these groups of methods. The scale of the index extends from zero to one. The value of zero indicates that no method in a given category is used by any company. A value of one indicates that all of the methods were used by all of the companies. A value of 0.25 would indicate that

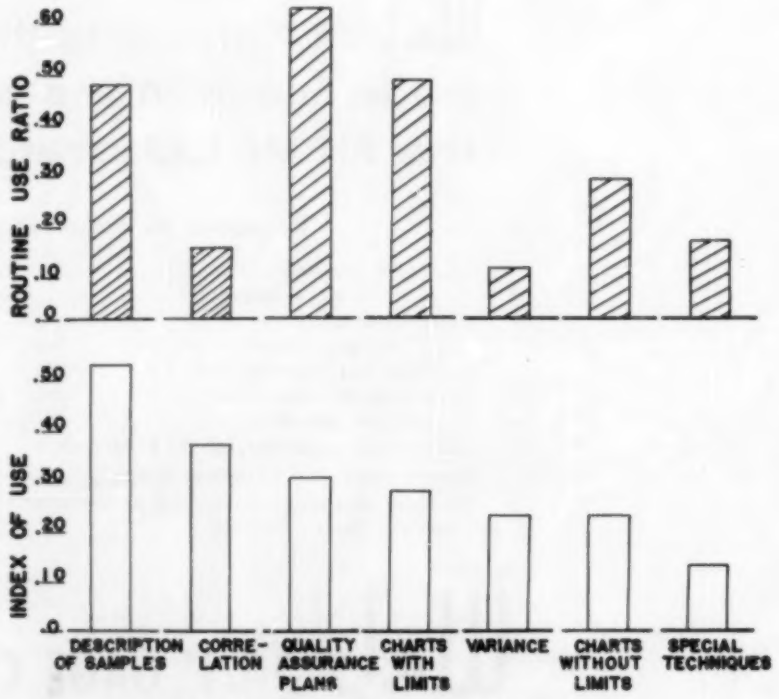


Figure 2—Comparison of Use of Selected Groups of Methods

electronic frequency changers

250VA and 1000VA capacity
60 ~ to 60 ~ or 60 ~ to 400 ~
accuracy to ±0.01%

- **accurate control of frequency**
- **accurate control of voltage**
- **good wave shape**
- **portable**
- **no special wiring or installation**

SPECIFICATIONS

Model	FCD250	FCD1000	FC1000
Input voltage	95-130VAC, 1ø, 50-60~	208 or 230VAC, 1ø, 50-60~	208 or 230VAC 1ø, 50-60~
Output voltage	115VAC, 1ø, adjustable between 110-120 volts		
Output Frequency	400 ~, adjustable ±10%	400 ~, adjustable ±10%	60 ~, adjustable between 45 and 65
Output voltage regulation	±1.0%	±1.0%	±1.0%
Output frequency regulation	±1.0% in standard models; ±0.01% with auxiliary frequency standard (output frequency is fixed when using frequency standard)		
Capacity	250VA	1000VA	1000VA
Load range	0.1 to full load		
Distortion	5% maximum		
P. F. range	Down to 0.7 F		
Time constant	0.25 seconds		
Envelope modulation	2% maximum		

These industrial and laboratory frequency changers resulted from contracts for precision inverters. They should prove useful for testing components or complete instruments that must operate over variable frequency conditions. They can also be used as sources for precision 60 ~ or 400 ~ for timing applications, or used with servo and/or gyro motors in design work.

Sorensen electronic frequency changers are also being used with field equipment such as geophysical vans, where motor generator set frequency control is often inadequate. Another use will be for checking equipment designed for 50 ~ (foreign) usage; conversely, the same instrument can be used to convert 50 ~ line to 60 ~ source.

Electronic frequency changers of other ratings are now in design. We shall be happy to send further information, or to correspond with you concerning your individual requirements. Address Sorensen & Co., Inc., 375 Fairfield Avenue, Stamford, Conn. In Europe, write directly to Sorensen A.G., Gartenstrasse 26, Zurich 2, Switzerland.

SORENSEN

375 FAIRFIELD AVENUE, STAMFORD, CONN.

all the methods in any one category were used by one-fourth of the companies or that one-fourth of the methods were used by all of the companies or that one-half of the methods were used by one-half of the companies or other similar combinations that would give a product of 0.25.

The routine-use ratio is defined as the ratio of routine use to total use.

The descriptive methods are those that are most used according to this scale of rating. The group called special techniques was the least used. These results are about as anticipated. The comments regarding the relation between useful methods and widely used methods must be remembered. The agreement of the pattern of the responses with the results expected is interpreted as a rough indication of the validity of the sample and of the accuracy of the replies. Note that more companies are using charts with limits than without limits. For routine use, charts with limits are considerably more popular than those without limits. This response indicates the use of control charts as distinguished from simply a graphical plot of the data. The ratio of routine to total use is the highest for quality assurance plans and is the lowest for analysis of variance methods. The indication of the routine use ratio is that analysis of variance, correlation, and the group of methods classed as special techniques are mostly used for occasional studies rather than for routine reports. On the other hand quality assurance plans are most popular for routine use as indicated by the routine use ratio of 0.634 which is the highest of the seven groups. Charts without limits are used more for occasional than for routine problems as indicated by the routine use ratio of 0.295.

Table I—Comparison of Use by General Groupings

Method Group	Index of Use	Routine Use Ratio
Description of Samples	.526	.478
Correlation	.374	.158
Quality Assurance Plans	.303	.634
Charts—with limits	.283	.493
Variance	.230	.120
Charts—without limits	.227	.295
Special Techniques	.135	.169

The wide use of correlation methods was an important factor in guiding the committee in the plans for the first series of case histories which will all be selected from the general category of correlation. The particular methods that will be selected represent a balance between those that are simple and widely used and those for which there was a rather high demand as indicated by the response that these methods are not used because they are not familiar or because the respondent would like to know more about them.

Summary

The information was gathered chiefly to guide the committee in preparation in case histories and other committee activities.

It is believed, however, that the results are of interest in themselves as an indication of the use of statistical methods in this particular field of application, and also as an example of a survey that is considered successful from the standpoint of a high percentage of returns.

Bibliography

JOSEPH MOVSHIN, *Editor*

Assisted by the Editorial Committee, St. Louis Section, ASQC

On matters concerning the Bibliography Department, send correspondence, suggestions, and contributions to:

Joseph Movshin
9220 Old Bonhomme Road
St. Louis 24, Mo.

Selected references in the Bibliography of *Industrial Quality Control* are obtained from the following sources:

The International Statistical Institute, *International Journal of Abstracts on Statistical Methods in Industry.*

The Chemical Division, ASQC.

The Statistical Committee, TAPPI.

APPLICATION—CHEMICAL INDUSTRY

COMPARATIVE ANALYSIS OF DIGESTER CORROSION MEASUREMENTS, by A. Ungar (Armour Research Foundation) and T. E. Caywood (Caywood-Schiller Associates)
(Tappi—v. 37, n. 5, May 1954, p. 177)

Corrosion in alkaline pulp digesters is examined through analysis of data from 198 digesters submitted by 29 mills. Data consisted of sequential digester thickness measurments and information on digester construction and operating conditions. Corrosion patterns in terms of directional variations in corrosion rates were determined. Statistical techniques were used to test hypotheses concerning the effects on corrosion rates of materials of construction, age of digester, mill process, and other operating variables. Illustrated with bar graphs. Includes a detailed statistical appendix of general interest.

APPLICATION—ELECTRICAL INDUSTRY

QUALITY CONTROL ON THE SETTING OF VOLTAGE REGULATORS, by David J. Desmond
(Applied Statistics—v. III, n. 2, June 1954, p. 65)

The author discusses the methods used in this particular application of statistical quality control from the beginning analysis of the problem through the final results obtained. More variation existed in certain voltage measuring equipment than in the specification itself. Great detail is given in this article on the problem and the method of analysis and solution.

APPLICATION—TEXTILE INDUSTRY

ANALYSIS OF RESULTS OF VISUAL TEST OF TEXTILE YARN, by A. G. Baker, K. W. Hiller, R. W. Woodward.
(Applied Statistics—v. 3, n. 1, Mar. 1954, p. 12)

(Continued on page 22)

balanced design

MEANS EVERY DETAIL PRECISELY RIGHT FOR BETTER, FASTER PRECISION MEASURING

INDUSTRIAL DISTRIBUTOR

only **Starrett**
MICROMETER CALIPERS
give you these
12 BIG FEATURES

All in perfect balance for

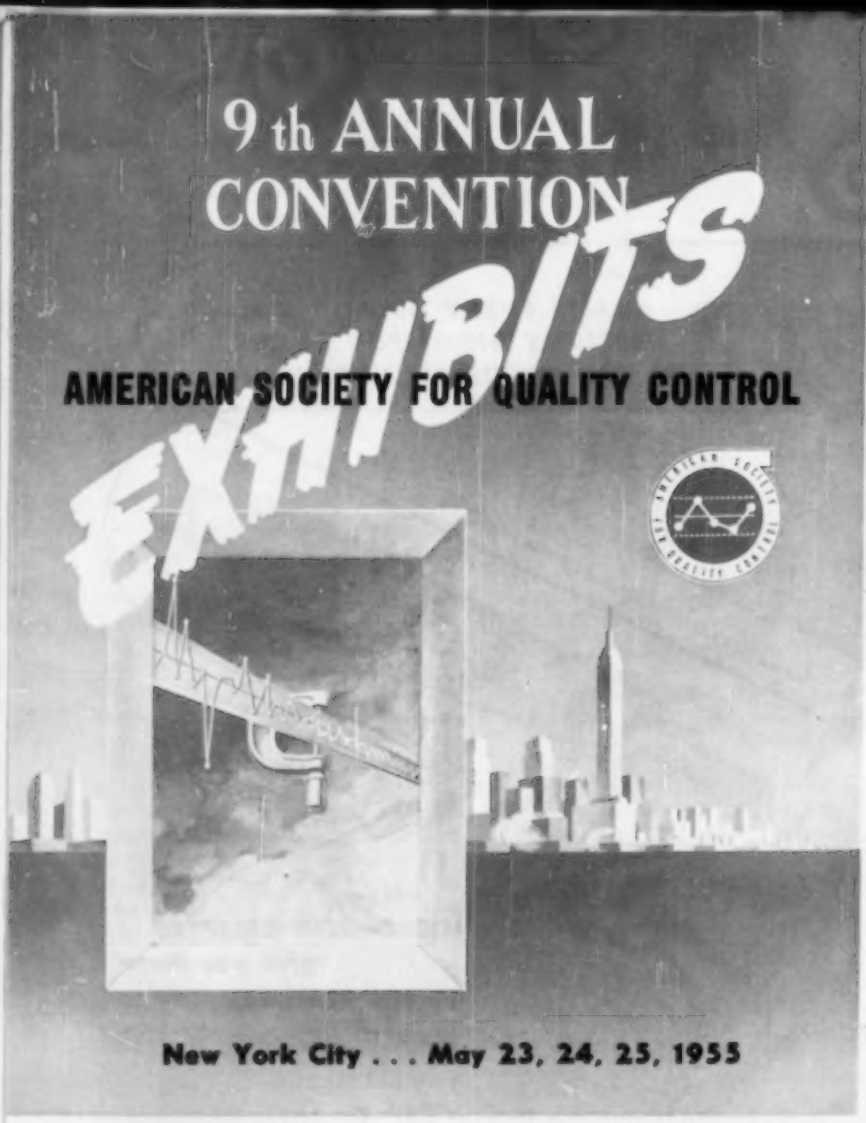
- Easy Handling
- Faster Measuring
- Easy Reading
- Lifetime Accuracy

1. **BALANCED DESIGN** — Advanced Design Throughout with Correct Thimble Diameter Insures Perfect Balance, Easy Handling and Better Readability.
2. **NO-GLARE SATIN CHROME FINISH** — On Thimble and Sleeve of all Micrometers and also on Frame of all Full Finish Micrometers. Easy to Read — Eliminates Squinting and Eye Strain. Highly Resistant to Stains, Corrosion and Wear.
3. **HI-MICRO LAPPED MIRROR FINISH** — On Faces of Anvil and Spindle, Insures More Accurate Measurements. Also Available with Tungsten Carbide Faces at slight additional cost.
4. **ONE-PIECE SPINDLE** — Extra-Rigid Integral Construction for Long, Accurate Life.
5. **EXTRA HARD THREADS WITH EXTREMELY FINE LEAD ACCURACY** — Special High Carbon Steel Gives Harder Threads Which are Hardened, Stabilized and Precision Ground from the Solid Under Temperature Controlled Conditions to Insure Lasting Precision.
6. **TAPERED FRAME** — Permits Measurements in Narrow Slots and Tight Places. Standard on All Full Finish Outside Micrometers.
7. **RIGID, ONE-PIECE FRAME** — Barrel is Integral with Frame for Maximum Rigidity, Accuracy and Long Life.
8. **EASY TO READ** — Large Diameter Thimble and Sleeve with Distinct Black Figures and Graduations Against Satin Chrome Finish. Measurements Easy to Read Under Any Illumination.
9. **QUICK READING FIGURES** — Every Graduation Numbered For Quick, Positive Identification.
10. **CONVENIENT DECIMAL EQUIVALENTS** — of 8ths, 16ths, 32nds and 64ths on Frame or Thimble of All Micrometers.
11. **QUICK, EASY ADJUSTMENT** — Only Two Simple Adjustments Maintain Starrett Accuracy.
12. **RATCHET STOP OR FRICTION THIMBLE** — Permits Consistent Measurements Independent of "Feel". **LOCK NUT** — Permits Locking of Spindle At Any Reading. Available At Slight Additional Cost.

Starrett®

"WORLD'S GREATEST TOOLMAKERS"

MECHANICS' HAND MEASURING TOOLS AND PRECISION INSTRUMENTS • DIAL INDICATORS • STEEL TAPES PRECISION GROUND FLAT STOCK • HACKSAWS, BAND SAWS and BAND KNIVES
THE L. S. STARRETT COMPANY, ATHOL, MASSACHUSETTS, U. S. A.



Present Your Story
To These Men:

- Chemists
- Consultants
- Engineers
- Foremen
- Inspection Supervisors
- Metallurgists
- Methods Supervisors
- Plant Executives
- Purchasing Agents
- Quality Control Personnel
- Statisticians
- Technical Directors

In These and Allied Fields:

- Agricultural Equipment
- Air Conditioning
- Aeronautical
- Automotive
- Ceramics
- Chemical & Pharmaceutical
- Communications & Electronics
- Education
- Electrical Equipment
- Foundries
- Glass
- Metals & Fabrication
- Military
- Paper
- Petroleum
- Plastics
- Textiles

The AMERICAN SOCIETY FOR QUALITY CONTROL

Cordially Invites You to Participate in the

NINTH A. S. Q. C. CONVENTION — 1955

MAY 23, 24, 25

HOTEL STATLER • HOTEL NEW YORKER • NEW YORK, N. Y.

Address Communications Regarding Booth Space to:
CHARLES R. KENDEL, LAMSON & SESSIONS CO.
1971 West 85th Street, Cleveland 2, Ohio

AMERICAN SOCIETY FOR QUALITY CONTROL

NINTH ANNUAL CONVENTION — NEW YORK, NEW YORK

PLEASE REPLY TO:

CONVENTION COMMITTEE

GENERAL CHAIRMAN
ELLIS R. OTT
UNIVERSITY COLLEGE
RUTGERS UNIVERSITY
NEW BRUNSWICK, N. J.

VICE-CHAIRMEN
AUGUST B. MUNDEL
SONOTONE CORPORATION
FRANK W. WEHRFRITZ
ESSO STANDARD OIL CO.
MASON E. WESCOTT
RUTGERS UNIVERSITY

SECRETARY
ALLEN R. CRAWFORD
RUTGERS UNIVERSITY

TREASURER
JOHN MAJOR
COLGATE-PALMOLIVE CO.

ARRANGEMENTS
DAVID VALINSKY
CITY COLLEGE OF N. Y.
PAUL H. CHOOK
CITY COLLEGE OF N. Y.

EXHIBITS
ROBERT R. PERO
SERVOMECHANISMS, INC.

PROGRAM
PHILIP B. PROCTOR
JOHNS-MANVILLE CORP.

PUBLICITY
DONALD A. TILDEN
AIR REDUCTION CO.

RECEPTION
ROBERT V. WELCH
E. I. DU PONT DE NEMOURS & CO.

REGISTRATION
WILLIAM E. GAUNT
E. R. SQUIBB & SONS
DIV. OF MATHIESON CHEMICAL CORP.

TRANSACTIONS
F. BRUCE MAY
JOHNSON AND JOHNSON

ADVISORY COMMITTEE
SIMON COLLIER
JOHNS-MANVILLE CORP.
ENOCH B. FERRELL
BELL TELEPHONE LABORATORIES, INC.
PAUL S. OLMSTEAD
BELL TELEPHONE LABORATORIES, INC.
WADE R. WEAVER
REPUBLIC STEEL CORP.

January 20, 1955

Fellow Members and Friends of A.S.Q.C.

Our Ninth Annual A.S.Q.C. Convention will be held in New York City on May 23, 24, 25 (1955). The Convention Committee has been making plans for many months and is proud of the program and arrangements which will be presented.

Hotel accommodations can be assured for those who pre-register provided they arrive not later than Monday morning, May 23. It is for this reason that we are breaking tradition by scheduling a Convention beginning on Monday. New York City is a great city; many of you will want to arrive on Saturday or Sunday—perhaps with members of your family—and be ready for the Technical Sessions which begin early on Monday morning.

Because many of you will arrive on Sunday evening, a cordial invitation is extended you to join us at an Open House sponsored by the Metropolitan Section (ASQC) at the Hotel Statler on Sunday evening, May 22. Registration facilities will be open on Sunday evening.

Our Technical Programs will be held in the Hotel Statler and the Hotel New Yorker. These rooms are all air-conditioned, luxuriously-furnished meeting rooms, with convenience for the speakers and registrants. There will be eight simultaneous sessions. You may select your program from a wide variety of panels on such topics as basic techniques, process control, management and advanced subjects—the whole gamut of topics from many fields of application and theory. You may take your choice.

We couldn't forget the ladies and an excellent program is being planned for them. A congenial social evening on Monday and the Annual Banquet on Tuesday are among the attractions. You will want to bring your colleagues, your friends, your management.

We take pleasure in extending to you a most cordial invitation to join us at this great Convention.

Sincerely yours,

Ellis R. Ott

Ellis R. Ott, Chairman
Ninth Annual Convention

New Adrian "QC" Fluoroscope Uncovers Hidden Defects *INSTANTLY*

in plastics, aluminum, light alloys, rubber, ceramics!

Here's the simple, low cost way for controlling quality in industrial products. The New Adrian "QC" Fluoroscope quickly spots internal defects in materials and parts . . . detects tramp metal in textiles, canned foods or drugs . . . shows up missing parts in small assemblies or deviation from design.

Easy to Operate; No Film Costs!

Once standards are set, any worker can perform most tests on the Adrian "QC" Fluoroscope. And because there's no film used, darkroom expense is eliminated. You get an instant reading on the fluoroscopic screen. Outline your inspection needs by letter for detailed recommendation.

FOR FREE BULLETINS, WRITE TO:

J. W. DICE CO. Englewood 8, N. J.

"Non-Destructive Testing and Measuring Instruments"

***How to speed production with* MAGNIFIERS**

New! Illuminated 10X Pocket Magnifier

WRITE for new handbook and catalog, "Industrial Magnifiers—How to Choose and Use Them," Bausch & Lomb Optical Company, 50237 Bausch St., Rochester 2, N. Y.

Cut waste, get faster, surer inspection by fitting the magnifier to the job. This new Bausch & Lomb Illuminated Coddington floods entire viewing field with bright light *through* the lens, permitting quick, accurate, ON-THE-SPOT inspection, without need for outside lighting. Image quality is excellent! Carry this new magnifier with you always—anywhere..$7.50

Another product by Bausch & Lomb—recognized world leader in all things optical.

BAUSCH & LOMB *Magnifiers*

Quality of yarn is determined by a visual inspection and expressed in the count of defects noted in a given length of material. This subjective test of yarn quality can, however, provide reliable results. A specially planned set of observations was used to provide basic data to establish such tests.

APPLICATION—
MISCELLANEOUS

THICKNESS VARIATION OF POLYETHYLENE FILM, by D. H. Denholm and D. C. Wyland (Industrial Engineering Department, Chase Bag Company)
(Paper, Film and Foil Converter, Oct. 1954)

This article describes the use of quality control methods in establishing specifications on polyethylene film. Yield and gauge are primarily considered. Control charts and frequency distributions are used to measure variability and determine acceptability.

ESTIMATING DAILY ORDER RECEIPT FROM WEIGHT OF MAIL, by C. W. Smalley (Sears Roebuck and Co.)
(The American Statistician—v. 8, n. 1, Feb. 1954, p. 14)

Long range estimates of volume of orders are necessary for planning. In addition to this, daily schedules are necessary to control processing through the same operating channels and personnel on a cycle of approximately 15 minutes. Experience has developed information on how many orders can be expected from each pound of mail. Mail received prior to 8:00 a.m. is used to estimate before 8:30 a.m. daily the number of orders that will be received that day. The estimates vary from actual receipts by about one-half of one percent.

CONTROL CHARTS

NEW TYPE OF CONTROL CHART LIMITS FOR MEANS, RANGES, AND SEQUENTIAL RUNS, by G. H. Weiler
(Journal, American Statistical Association—v. 49, June 1954, p. 298)

This article shows a method of setting control limits that provide a fixed percentage of type I errors, independent of the sample size. This method is shown for limits on average, range, and sequential run charts. The author shows by graphic presentation, the average amount of inspection in terms of the amount by which the population mean has changed for various sample sizes. Generally, the

Newer Than NEW!...

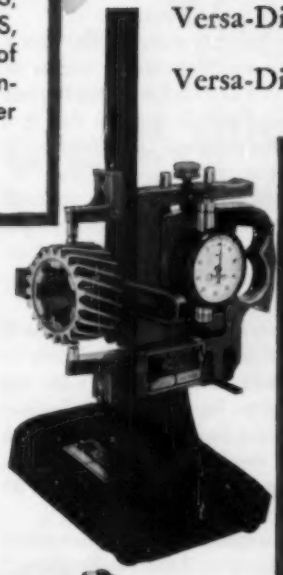
Versa-Dial

Introducing STANDARD'S new truly all purpose dial unit . . . a simple, easily operated, direct reading instrument, with a potential for nearly all types of INTERNAL and EXTERNAL applications.

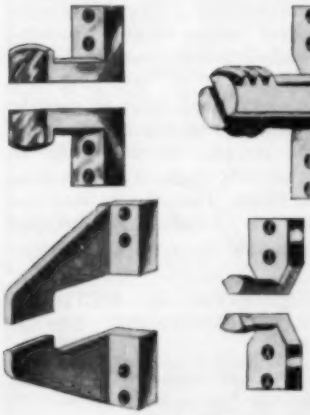
Interchangeable segments permit checking of THREADS for over-all fit, pitch diameter, or lead. Gears for pitch diameter or tooth spacing; also GROOVES, shallow COUNTERBORES, narrow SHOULDERS, BLIND HOLES, etc. . . . an almost unlimited variety of work. The VERSA-DIAL can be converted from one type of job to another in moments.

PATENT PENDING

Versa-Dial **INTERNAL THREAD COMPARATOR**



Versa-Dial **HELICAL GEAR PD COMPARATOR**
mounted on bench stand



Interchangeable Segments

VERSA-DIAL FEATURES

- ★ **EXTREMELY VERSATILE;** good for almost any job
- ★ **EXCEPTIONALLY WIDE RANGE** up to 7" or more
- ★ **QUICK AND EASY TO SET-UP** for long or short runs
- ★ **RAPID LOADING;** easy to operate
- ★ **LONG LIFE;** minimum contact wear

Segments are secured in T-Slots at desired spacing . . . movable segment actuates dial indicator, giving direct reading of variations from basic size. Movement is straight; unusually smooth and precise . . . ideal for gaging.

Versa-Dial **EXTERNAL THREAD COMPARATOR**

STANDARD Gage Co., Inc.
Poughkeepsie, N.Y.

HOW TO SUCCEED WHILE YOU'RE STILL YOUNG

IT SURPRISES many people to learn that the average age of the men who respond to our advertisements is closer to forty than to twenty. But it's not hard to understand why this is true!

Most young men are *satisfied* with their progress in business. Their native ability and energy are enough to win them regular promotions and salary increases. They find success only a matter of time.

But the day comes, often with a shocking suddenness, when this easy and casual progress ends abruptly.

Many a man wakes up with a start in his thirties or forties to find that his income has leveled off, and that promotions have ceased.

"I'm not getting ahead as fast as I should," he says to himself. "Where am I going to be ten years from now?"

Why does this pathetic pattern appear in so many promising careers?

The answer is simple: Sheer ability and energy can carry a man to the mid-way point in business . . . *but only a thorough knowledge of business fundamentals can help him beyond that point.*

If you realize that fact while time is still on your side—and act on it—*you can succeed while you're still young.*

FREE . . . "FORGING AHEAD IN BUSINESS"

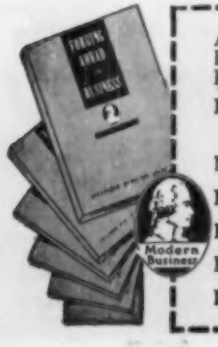
We do not claim that you must have the Alexander Hamilton Course in order to succeed in business. But we do say that *you cannot succeed without what is in the Course!*

All the Institute does is offer you a convenient and time-saving means of bringing this knowledge to you in your spare time; and in a form that has *proved* to be practical and effective for more than forty years.

So that you may judge for yourself whether or not you think the Institute can help you, we have published an informative 48-page book titled "Forging Ahead in Business."

We believe that this little book will help any man get down to bedrock in his thinking; however, there's no cost or obligation for it because—frankly—we've never been able to put a price on it that would reflect its true value. Some men have found a fortune in its pages.

If you would like a complimentary copy of "Forging Ahead in Business," simply sign and return the coupon below. It will be mailed to you promptly.



ALEXANDER HAMILTON INSTITUTE
Dept. 299, 71 W. 23rd Street, New York 10, N. Y.
In Canada: 57 Bloor St., W., Toronto, Ontario, Canada

Please Mail Me, Without Cost, a Copy of Your 48-Page Book—
"FORGING AHEAD IN BUSINESS"

Name_____

Firm Name_____

Business Address_____

Position_____

Home Address_____

average amount of inspection can be reduced by using larger sample sizes, but it is often necessary to use small samples in spite of the loss in power. The discussion on the use of charts on sequential runs shows that the power of the smaller samples can be increased, through the use of this chart.

ENGINEERING AND EXPERIMENTS

EXPERIMENTAL DESIGN IN INDUSTRY, by H. C. Hamaker (Biometrics—v. 10, n. 1, Mar. 1954, p. 187)

The idea of "experimental design" in a statistical sense is usually assumed to imply a vastly different approach in experimentation. However, it is possible to present such analyses as relationships between various factors in such a way that the concepts can be easily accepted. Such work can be accomplished without resorting to probability theories or tests of significance. The author stresses the need for applying a logical understanding of the concepts of experimental design and for avoiding statistical jargon and mathematical abstractions.

THE DESIGN OF EXPERIMENTS IN NAVAL ENGINEERING, by B. B. Day (U. S. Naval Engineering Experiment Station) (The American Statistician—v. 8, n. 2, April-May 1954, p. 7)

A comparison is drawn between "classical" plans of experimentation and statistical designs. A simple factorial plan involving two factors with replication is used to explain the advantages of the statistical designs in the study of cause of dirty engines and sticking piston rings. The step by step approach is carefully developed using actual data from the samples.

EXTREME-VALUE METHODS FOR ENGINEERING PROBLEMS

(National Bureau of Standards Technical News Bulletin—v. 38, n. 2, Feb. 1954, p. 29)

Extreme values are of great practical importance in such diverse engineering applications as floods and droughts, gust loads of an airplane, strength of materials, breakdown voltage of capacitors, and climatology forecasts. The necessary methods have been developed over the past 20 years and have been brought together for practical use in a group of lectures and a booklet of tables issued by the National Bureau of Standards.

McGRAW-HILL

Outstanding Books

CASE STUDIES IN INDUSTRIAL MANAGEMENT

By JOSEPH M. JURAN, Consulting Management Engineer, New York; and NORMAN N. BARISH, New York University. In press

A book of case studies for supplementary use to all Industrial Organization and Management texts. It is a new answer to the old problem of providing students with a realistic substitute for actual plant work, presenting for the first time, in detail, the management workings of an entire company. The format, supplying ample room for illustrations, charts, and diagrams, is a real advantage. A liberal complement of questions, problems, and discussions for classroom use relates directly to the case material.

QUALITY CONTROL HANDBOOK

Edited by J. M. JURAN, Consulting Management Engineer. *Industrial Organization and Management Series.* 800 pages, 244 illustrations, 92 tables and charts, $12.00

This comprehensive book presents in thorough, practical form the whole story of quality control. It contains a wealth of ready-reference facts and practical working data developed in industry for producing better quality at lower cost. It thoroughly discusses specification, organization for quality, acceptance, control, assurance of quality, and statistical methods in the quality function. Special sections are devoted to the application of quality control in specific industries, the methods of record-keeping involved, and the use of electric accounting machines in the quality function.

STATISTICAL QUALITY CONTROL

Second Edition

By EUGENE L. GRANT, Stanford University. *McGraw-Hill Industrial Organization and Management Series.* 557 pages, $7.00

The second edition of this leading text, includes such modern techniques as acceptance sampling, Shewhart control charts, etc. which have proved especially useful in recent years and which have been widely applicable. As before, the text is a working manual in which the author explains simple but powerful techniques that can be used to reduce costs, improve quality, and secure better coordination between design, production, and inspection.

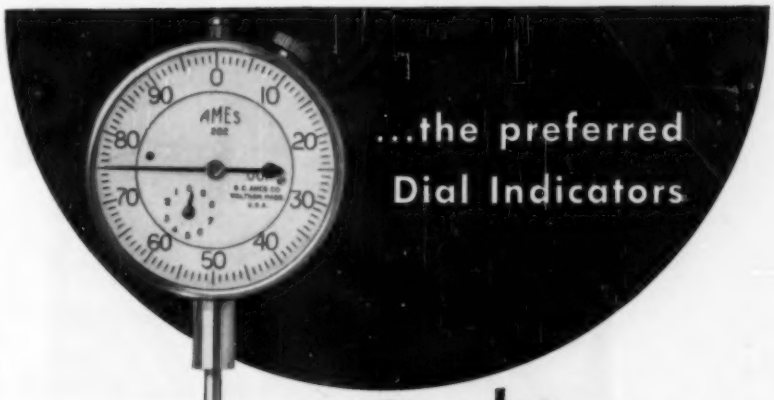
Send for copies on approval

McGRAW-HILL BOOK CO.

330 West 42nd Street

New York 36, N. Y.

AMES



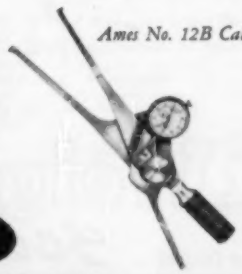
Over 16,000,000 cycles without wear or loss of accuracy . . . how many more will they complete?

Several Ames Long Range Dial Indicators *with plain bearings* are currently giving an amazing demonstration of performance and endurance under test. Several Model 282 Indicators, selected at random from our stock, still have their original accuracy – after more than 16,000,000 cycles each, at 240 strokes a minute, 9 hours a day.

This outstanding record is made possible by Ames' use of simple basic design, highest quality materials, rugged construction . . . and expert craftsmanship.

How many more cycles will these Ames indicators complete?

Ames No. 2 Dial Comparator



Ames No. 12B Caliper Gauge

Ames No. 552 Dial Micrometer

If you would like to have our recommendations on your measurement problem, send blueprints and specifications. And ask for your free copy of our catalog on Ames micrometer dial indicators and gauges.

Representatives in principal cities.

B. C. AMES CO. *32 Ames Street, Waltham 54, Mass.*

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

MANAGEMENT AND PERSONNEL, GENERAL

CASE HISTORY ON QUALITY CONTROL, by Francis E. Jolliffe, Supervisor of Inspection, Warner Gear Division of Borg-Warner Corp.
(Steel—v. 135, n. 18, Nov. 1, 1954, p. 86)

The introduction of a quality control program at Warner Gear is briefly described. Selling the program and follow-up are stressed.

THE QUALITY BOGEYMAN, by R. L. Geiger, Controller, American Aluminum Co.
(The Journal of Industrial Engineering—v. V, n. 5, Sept. 1954, p. 7)

This article discusses the problem of establishing an economical balance between the "best" quality control and that needed to establish an economically sound quality. Three bogey's are referred to. These are:

1. "Ideal statistical quality control"
2. "Ideal inspectors"
3. "The Specialist"

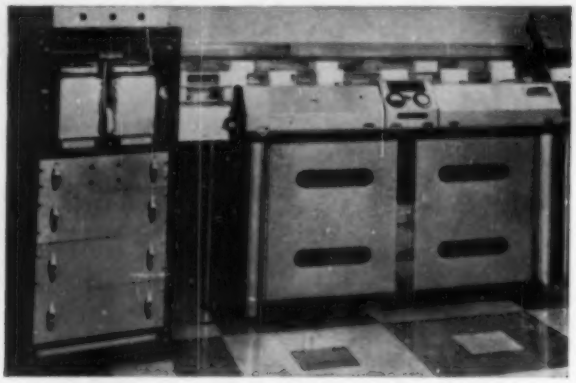
The need for clear specifications and systematic applications are indicated.

INDUSTRIAL MANAGEMENT

MATHEMATICAL METHODS IN MANAGEMENT PROGRAMING: PART II, by R. T. Nelson and M. E. Salveson
(The Journal of Industrial Engineering—v. V, n. 5, Sept. 1954, p. 17)

The second in this series of articles considers the sequence in which production processes must be carried out and the limits of a machine to handle one item at a time, or to process one item at a time. These lead to the development of mathematic models to evaluate the effective use of equipment under these assumptions. A detailed discussion of the mathematics and considerations involved is presented. The first article of this series was reviewed in the November 1954 BIBLIOGRAPHY.

OR OR IE? by Dr. Robert N. Lehrer
(The Journal of Industrial Engineering—v. V, n. 5, Sept. 1954, p. 24)



MEASURE...COMPARE...CORRECT

MEASURE your entire production output—eliminate doubtful "sampling." The SELECTROL checks *every* unit produced. It automatically weighs, classifies, sorts, and records.

COMPARE every unit produced and learn immediately the range and average of units *as they are produced*. The Average and Range Control Plotter records each production unit as it flows over the SELECTROL.

CORRECT your filling machine settings. Eliminate your assignable causes rapidly.

The SELECTROL Automatic Checkweighing Machine is designed for direct insertion into your production line. It's a time-proven production machine in use on hundreds of industrial production lines. Write today for complete details.

Exact Weight Scales
Better quality control
Better cost control
THE EXACT WEIGHT SCALE COMPANY
957 W. Fifth Avenue, Columbus 8, Ohio
In Canada: P.O. Box 179, Station S, Toronto 18, Ont.

DoALL MONOLIGHTS
(Monochromatic Light Source)
for use with Optical Flats
Millionths-inch measurement of flatness, size, parallelism
3" size covers 14" working area.
• Powerful light creates sharp fringe lines.
• Head turns 180°, removable
• Lightweight, portable case
• Three Sizes 2" - 5" - 20"
Also
DoALL OPTICAL FLATS ALL SIZES
See one at your plant—See classified directory for your local DoALL Service-Store with complete stocks of gages and metal-working necessities.
Immediate delivery from local stock
Call Your DoALL Service-Store
Machine Tools Cutting Tools Measuring Instruments Shop Supplies In Stock
The DoALL Company, Des Plaines, Ill.

This editorial discusses the relationship between Operation Research and Industrial Engineering and attempts to clarify the position of each.

WORK SAMPLING—TO SET STANDARDS ON INDIRECT LABOR? by Daniel E. Mahaffey, Eastman Kodak Company
(Factory Management and Maintenance—v. 112, n. 11, Nov. 1954, p. 143)

An application of work sampling techniques on indirect incentive is described. This article applies to theory of work sampling in a specific application.

MISCELLANEOUS

INSTRUMENTATION FOR STATISTICAL QUALITY CONTROL, by W. Hecox, R. L. Merrill
(Instrument Society of America, Journal—v. 1, n. 4, Apr. 1954, p. 29)

This article describes the use of instruments that can assist statistical operations for the control of certain types of production processes. The nature of product variation in high speed production lines is the key to the use of such equipment. The use of control charts for variables and the operation of an average and range computer in control and indicating systems is described.

THEORY AND APPLICATION—GENERAL

QUALITY CONTROL THROUGH STATISTICAL METHODS: VI, by Norbert L. Enrich
(Modern Textiles—v. 35, n. 3, Mar. 1954, p. 44)

Mr. Enrich discusses the use of the $n\bar{p}$ and p charts and shows the method of calculating control limits by both the Poisson and Binomial methods. He illustrates uses of these charts in the textile mill. The author also discusses the use of the coefficient of linear variation in determining the degree of perfection of a given process. He obtains this by the following formula:

$$\text{Degree of perfection in \%} = \frac{\text{Expected Coefficient} \times 100}{\text{Actual Coefficient}}$$

(Part VI was inadvertently omitted in the July BIBLIOGRA-

DoALL Granite
SURFACE PLATES
Non-Rusting • Non-Magnetic • Utmost Accuracy • Cheaper Than Metal Plates
• Wear Free
• Shock Proof
• Harder than hardened steel
• Velvet Smooth
• Unsurpassed for Production, Inspection and Layout Work
SIZES SHAPES AND ACCURACIES FOR EVERY REQUIREMENT
INDIVIDUAL Working Flats only $22.50 Ea.
DoALL
2" x 8" x 12" .0002" Surface Accuracy
Consult your yellow Directory for location of nearest of the thirty-eight DoALL Sales-Service Stores that stock complete metal working necessities.
Call Your DoALL Service-Store
Machine Tools
Cutting Tools
Measuring Instruments
Shop Supplies
In Stock
The DoALL Company, Des Plaines, Ill.

color-glance

Brinell Hardness Tester

- Automatically signals relative hardness.
- Speeds up testing cycle with greater economy, yet assured accuracy.

3 colored lights *immediately* tell you:

TOO HARD —— yellow
WITHIN RANGE — green
TOO SOFT ——— red

The right color flashes automatically during each test

Here is the machine that decides for you which pieces are of proper hardness. Ranges are adjustable, easily set up by using pieces of known hardness or test bars. Color-Glance Brinell Hardness Tester is another Steel City *first*. For more than 40 years Steel City has designed and built better machines, with your particular application in mind.

Ideal for automation.

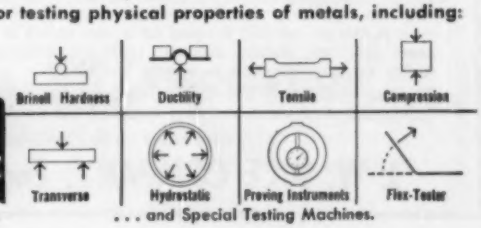
The electrical circuits which operate the color signals can be used to physically sort parts after testing.

Patent Pending

Steel City has qualified sales representatives in major metal-working areas for your convenience. Write today for name of nearest representative, and detailed information on complete line.

Manufacturers of machines for testing physical properties of metals, including:

Steel City Testing Machines Inc.
8803 Lynden Ave., Detroit 38, Mich.



. . . and Special Testing Machines.

PHY which listed part VII of Mr. Enrick's Series)

QUALITY CONTROL THROUGH STATISTICAL METHODS: VIII READY MADE SAMPLING PLANS by Norbert L. Enrich
(Modern Textiles—v. 35, n. 5, May 1954, p. 42)

In the last of his series of articles on statistical quality control, Mr. Enrich gives the method of using ready made sequential sampling plans. The dangers and risks taken in sampling are briefly discussed. The author points out some of the particular difficulties of sampling in the textile industry. One of these difficulties is the continuous production of cloth where the sample cannot be completely random. To compensate for the lack of randomness, Mr. Enrich gives a table of increased sample size.

STATISTICS

JOINT CONFIDENCE REGIONS FOR MULTIPLE REGRESSION COEFFICIENTS, by D. Durand
(American Statistical Association, Journal—v. 49, Mar. 1954, p. 130)

SOME THEOREMS FOR PARTIALLY BALANCED DESIGNS, by W. S. Connor and W. H. Clatworthy
(Annals of Mathematical Statistics—v. 25, Mar. 1954, p. 100)

MAXIMA OF THE MEAN LARGEST VALUE AND OF THE RANGE, by E. J. Gumbel
(Annals of Mathematical Statistics—v. 25, Mar. 1954, p. 76)

TESTING DIFFERENCES BETWEEN MEANS IN AN ANALYSIS OF VARIANCE, by M. Keuls
(Biometrics—v. 10, n. 1, Mar. 1954, p. 167)

DECISION BETWEEN TWO ALTERNATIVES: HOW MANY EXPERIMENTS? by M. J. Healy
(Biometrics—v. 10, n. 1, Mar. 1954, p. 168)

SOME NEEDED TESTS OF SIGNIFICANCE, by J. W. Hopkins
(Biometrics—v. 10, n. 1, Mar. 1954, p. 167)

EXPERIMENTAL DESIGNS IN INDUSTRY, by E. A. G. Knowles
(Biometrics—v. 10, n. 1, Mar. 1954, p. 186)

TEST FOR SKEWNESS WITH ORDERED VARIABLES, by F. N. David and N. L. Johnson
(Annals of Eugenics—v. 18, Mar. 1954, p. 351)

"MONTE CARLO" METHODS FOR THE ITERATION OF LINEAR OPERATORS, by J. H. Curtiss
(Journal of Mathematics & Physics—v. 32, Jan. 1954, p. 209)

INVENTORY PROBLEM, by M. Rosenblatt
(Econometrica—v. 22, Apr. 1954, p. 244)

COUPON COLLECTING FOR UNEQUAL PROBABILITIES, by H. von Schelling
(American Mathematical Monthly—v. 61, May 1954, p. 306)

NEW TECHNIQUES FOR THE ANALYSIS OF ABSENTEEISM DATA, by A. G. Arbous and H. S. Sichel
Biometrika—v. 41, June 1954, p. 77)

TWO-STAGE PROCEDURES FOR ESTIMATING THE DIFFERENCE BETWEEN MEANS, by S. G. Ghurye and H. Robbins
(Biometrika—v. 41, June 1954, p. 146)

CONTINUOUS INSPECTION SCHEMES, by E. S. Page
(Biometrika—v. 41, June 1954, p. 100)

"the reference standard of industry"
CARSON-DICE ELECTRONIC
MICROMETERS

- offer direct, pressureless measurements to .000020"
- eliminate "feel" as a source of error
- measure hard or soft, conducting or non-conducting materials

If you are working with close tolerances or compressible materials, it will pay you to investigate Carson-Dice Electronic Micrometers.

Unlike ordinary electronic comparators, Carson-Dice instruments are direct measuring devices. They do not require a known standard, exert no pressure and therefor eliminate "feel" as a source of error with resilient materials. Model W. pictured above and three other models are specially designed for a wide variety of measuring applications in metals, paper, cellophane, plastics, diaphram, radio and television and many other industries. All models are fully described in bulletin No. 4001.

Dice also manufactures a number of non-destructive testing and measuring instruments for Quality Control of metals and other materials. All are described in Bulletin No. 32.

Write today for free bulletins to:

J. W. DICE COMPANY, Englewood 8, N. J.

OPERATIONS RESEARCH

OPERATIONS RESEARCH: PAST, PRESENT AND FUTURE, by Philip M. Morse, Professor of Physics, Massachusetts Institute of Technology.

(Advanced Management—v. XIX, n. 12, Nov. 1954, p. 10)

This article presents to those interested in industrial management some of the history of operations research and its development. The author stresses the fact that operations research is a tool with limitations as well as advantages. The effect of reducing problems to a mathematical model is noted. Certain mathematical models briefly noted are the "queuing" or "waiting-in-line" theory, "Monte Carlo" technique, "linear programming" and "optimum distribution of effort."

OPERATIONS RESEARCH—WIDENING THE HORIZON OF INDUSTRIAL ENGINEERING? by D. G. Malcolm, Staff Member, the Operations Research Office, Johns Hopkins University

(The Journal of Industrial Engineering—v. V, n. 5, Sept. 1954, p. 3)

This article discusses some of the advantages of operations research and briefly describes certain basic concepts. This includes gaming, programming, and queueing theory. Mathematical charts and tables are used to illustrate the translation of the theory to a mathematical model for the solution of specific problems. The part that industrial engineering may play in the use of operations research techniques is discussed.

THE MEANING OF OPERATIONS RESEARCH, by Van Court Harte, Jr., Operations Research Group, Case Institute of Technology

(The Journal of Industrial Engineering—v. V, n. 5, Sept. 1954, p. 9)

The diversity of possible applications of operations research is one of its principle values. However, although it may be applied to many different types of problems, they have a common factor; arriving at a decision. Operations research is then "a method of inquiry aimed at evaluating decisions in complex situations." This article very briefly indicates decisions that are made in science, war and industry. Detailed discussion as to what a decision involves and how decisions are reached is given. Sample charts illustrate the problem of making a decision in a complex situation.

DO YOU WANT PRODUCTION OR PROFIT? by Nyles V. Reinfeld

(Tooling & Production—v. XX, n. 5, Aug. 1954)

This article describes an application of linear programming to the selection of production scheduling from a tube mill. A discussion of the problem of basing a decision on the maximum production versus maximum profit is given. Linear programming is described and illustrated in some detail.

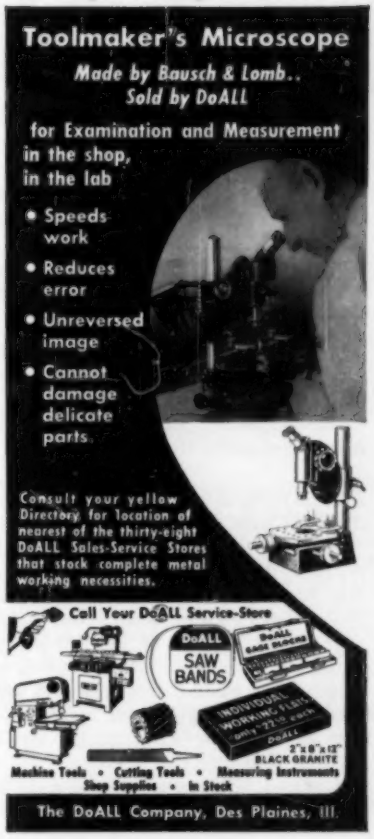
REPORTED NOT REVIEWED

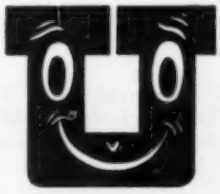
LIFE TESTING, by Benjamin Epstein and Milton Sobel

(Journal, American Statistical Association—v. 48, n. 263, Sept. 1953, p. 486)

METHODS OF MEASURING USEFUL LIFE OF EQUIPMENT UNDER OPERATING CONDITIONS, by Leo A. Goodman

(Journal, American Statistical Association—v. 48, n. 263, Sept. 1953, p. 503)


Toolmaker's Microscope
Made by Bausch & Lomb..
Sold by DoALL
for Examination and Measurement
in the shop,
in the lab
• Speeds work
• Reduces error
• Unreversed image
• Cannot damage delicate parts
Consult your yellow Directory for location of nearest of the thirty-eight DoALL Sales-Service Stores that stock complete metal working necessities.
Call Your DoALL Service-Store
DoALL SAW BANDS
Machine Tools • Cutting Tools • Measuring Instruments
Shop Supplies • In Stock
The DoALL Company, Des Plaines, Ill.

The New  Program

is the only continuing program that creates plant-wide participation and enthusiasm among production workers and their job leaders

WITHOUT FINANCIAL INCENTIVES

Write Today

for full and free information on this newly proved and effective plan for two-way communication for Quality between your management and your production people.

NATIONAL ASSOCIATION

Effective Communications with Employees

29 Worthington Street **Springfield, Massachusetts**

Local Section News

". . . BUT NOT FORGOTTEN"

ALBUQUERQUE B. J. Russo, liaison engineer with the quality assurance department at Sandia Corp. spoke on "Some Aspects of Quality Control Systems in Use Today" at a meeting of the Albuquerque Section on Dec. 1.

ALLENTOWN-BETHLEHEM Warren Jones, head of Management Controls, Des Plaines, Ill. spoke to the Allentown-Bethlehem Section on Nov. 11, at our monthly meeting at Hotel Traylor. Mr. Jones's talk was entitled "Management Reports to Prove the Value of Quality Control."

The first lessons of both the fundamental and advanced course on Quality Control at Muhlenberg College proved quite interesting and very promising. These courses are being offered by the Allentown-Bethlehem Section and are being taught by Miss Bonnie Small, Western Electric Co.

BUFFALO The new season was successfully launched with our annual "get acquainted" night and the ever popular joint meeting with our Toronto neighbors the following month. Leon Bass of the General Electric Co. gave a splendid talk at our Nov. 29 meeting. The introduction of dinner meetings prior to our regular meeting or plant tour is very stimulating and has added considerably to the evening's enjoyment.

BUZZARDS BAY Paul Flatow, associate professor at New York University who is associated with Dr. Adam Abruzzi, Stevens Institute of Technology, in the field of quality control and industrial engineering, addressed the Nov. 16 meeting. Mr. Flatow spoke on "QC Method Applications to Work Measurement Problems."

ERIE At our Oct. 6 meeting we held our Quality Control Workshop I concerning the "Student t Test." The workshop format permitted member participation to the greatest degree yet at our meetings. Actual cases where "t tests" could be used were presented by Clarence Haycox, David Ferrell, and H. S. Herrick.

On Nov. 3 we studied the advantages of using automatic calculating machines for running linear correlations. The demonstration was presented by C. S. MacDougall, manager of the local Monroe Calculating Machine Co. office. A question period followed the presentation.

HUNTSVILLE Norman Garner, assistant chief industrial statistician, Thiokol Chemical Corp., was the speaker at the November meeting of the Huntsville Section. Mr. Garner presented some of the fundamental statistical concepts that the engineer should know about so that he and the statistician can work together to get optimum information from an experiment.

INDIANAPOLIS On. Nov. 16, at 1:30 p.m., the Indianapolis Section started the day's program with a plant visit at the Chrysler Corp. At 4:30 p.m., a panel discussion on the subjects of process control, receiving inspection, and vendor certification was presented in the World War Memorial Bldg. This panel was led by Carl Hoover, Perfect Circle Corp. The panel members were Don Flanders, Allison Division, GMC.; I. W. Burr, Purdue University; and H. F. Wilson, Ross Gear and Tool Co.

The evening meeting, starting at 7:30 p.m. in the Indiana State Board of Health Bldg., was addressed by Arthur Bender, Jr., quality control engineer at Delco-Remy Division, GMC. He presented a very informative talk about "A Graphical Method of Determining the Characteristics of a Frequency Distribution." This presentation was the required audience participation and was well received by all.

INDIANAPOLIS Lafayette Sub-Section On Dec. 1, this group was addressed by Virgil Alexander, J. D. Adams Mfg. Co., Indianapolis. The subject of his talk was "Operation Confidence."

INDIANAPOLIS Columbus Sub-Section On Nov. 18 the Columbus Sub-Section was addressed by Jack N. Bussell, Allison Division, GMC. The subject of his talk was 'Quality Control Techniques for Investigational Purposes." The meeting was held in the Cummins Engine Company Training Center.

INDIANAPOLIS Richmond Sub-Section On Nov. 24 the Richmond Sub-Section was addressed by Wm. E. Spencer, Allison Division, GMC. He discussed the training program of the Indianapolis Section. The meeting was held at the Sleeve Casting Plant of Perfect Circle Corp. in Richmond.

LINCOLN Frank J. Dudek of the University of Nebraska gave a very well presented and very well received talk on Analysis of Variance at the November meeting in Lincoln. His simple chalk-talk illustrations made a difficult subject reasonably easy to follow. A question session followed his discussion.

LOS ANGELES At the November meeting of the Los Angeles Section, O. B. Moan, Lockheed Missile Division, acted as moderator and presented brief historical background of computers from the abacus to "Univac." Capabilities of computers

were identified by J. J. Korth, International Business Machines, and R. M. Hayes, Electronics Div., National Cash Register Co. J. R. Crawford, Lockheed Aircraft, recounted experiences of using computers to solve lengthy elaborate problems relating to sampling inspection plans. The activities of Hughes Aircraft in the manufacture of computers were capably described by Miss Shirley Levinson, and Leo Aroian of Hughes spoke of the value of computers in R & D programs and reliability studies.

MICHIGAN At the advanced technical session held in Ann Arbor on Nov. 19, Fred C. Leone, Case Institute, presented to the group a relatively new and quite useful tool, "Circular Probability Paper." His talk covered both the theory behind the "paper" and some practical applications showing how to use it.

MILWAUKEE The regularly scheduled meeting of the section on Nov. 15 was to consist of a plant tour of the A. O. Smith Corp., Milwaukee, followed by the evening program at which Ray Saddoris was to have been the guest speaker. Due to Ray's sudden and untimely passing on Nov. 13, this meeting was postponed to Nov. 22. The tour of A. O. Smith's facilities was most interesting, and following the tour L. S. Eichelberger, assistant to the director of quality, A. O. Smith, presented to the group Ray's paper, "A Better Way." (The full text of this paper is presented in this issue on page 8.) At the evening dinner meeting at the Wisconsin Hotel, H. J. Jacobson, Grand Sheet Metal Products Co., did the honors as guest speaker and presented an inspiring talk on "QC by Infiltration."

MINNESOTA Arthur Bender Jr., Delco-Remy Div., GMC, was the speaker at the regular monthly dinner meeting at Minneapolis on Nov. 4. The subject of his talk was "Quicksee."

MONTREAL A large turnout was present to hear John Pringle, this year's chairman of the Montreal Section, talk on basic techniques in SQC. Mr. Pringle used many illustrations and demonstrations to explain to the audience the fundamentals of SQC.

NEW HAVEN On Nov. 9, the third dinner meeting of the 1954-55 season was held at the Colonial House, Hamden, Conn. These dinner meetings have been very successful and are quite popular with the membership.

The guest speaker of the evening was V. E. Lysaght, Wilson Mechanical Instrument Div., American Chain and Cable Co., on the topic "Hardness Testing." His interesting and informative lecture was well received by the good attendance.

RICHMOND A stimulating panel discussion on "Statistical Tests of Significance" was the subject of the section meeting on Nov. 23. Clinton W. Baber, Larus Bros., was the moderator and provided for a fine program by assigning various phases of the subject for discussion to the panel members James Armstrong, duPont; G. P. Burns, American Viscose; W. L. Dunn, College of William and Mary; J. T. McCormack, Reynolds Metals.

ROCKFORD Arnold E. Jakel, quality control consultant from Milwaukee, addressed the Rockford Section on Nov. 24 on problems related to heat treating. Mr. Jakel complimented two past chairmen of the Rockford Section by quoting an IQC article they co-authored in September, 1950, and showing how he used it in a heat treating problem. George Foster, managing editor of IQC, was also a welcome guest of the section and gave an excellent "commercial" for IQC advertising.

ST. LOUIS The St. Louis Section at its Nov. 19 meeting conducted a panel discussion on "The Administration of Quality Control Techniques." Thomas Leahy of the White Rodgers Electric Co. acted as a moderator. Kort Pfabe, assistant production manager of Carter Carbureter, and William Walsh, chief inspector of the Chevrolet Division, acted as the panel. All of these men, Leahy, Pfabe and Walsh, have actually been administrators of quality control in their plants and they presented to the St. Louis group a very interesting program which was well attended.

SALT LAKE CITY On Nov. 11 at the University of Utah, Roy A. Wylie, quality control engineer, Micro Switch Div. of Minneapolis Honeywell Co., Freeport, Ill. addressed over 50 members and guests. Mr. Wylie, who is editor of the "What's New" department of IQC, gave a very interesting slide-illustrated talk on the application of quality control to existing manufacturing processes and new products.

SCRANTON-WILKES BARRE On Nov. 18, August Mundel, Sonotone Corp., discussed management and its relationship to the quality control organization, provoking considerable thought among the interested audience.

SEATTLE Chester Gordon, Huff and Gordon, Management Consultant, gave a fine presentation on the topic "Operations Research and Quality Control" at the November meeting of Seattle Section. His talk was filled with examples of how problems may be solved or decisions reached through the teamwork of this relatively new management tool.

SOUTH BEND-MISHAWAKA Richard C. Calahan, assistant superintendent of the inspection department, Singer Manufacturing Co. was speaker for the November meeting and chose as his subject "Some Management Aspects of Quality Control." His theme for this talk was "Illegitimus Non Carborundum," a literal translation of which will be given any member who wishes to contact Mr. Calahan.

SOUTHERN CONNECTICUT The Southern Connecticut Section had as guest speaker for its second annual Management Night H. Thomas Hallowell, Jr., president of Standard Pressed Steel Co., Jenkintown, Pa. The event took place at the Stratfield Hotel in Bridgeport on Nov. 10 with a dinner at 6:30 p.m. and the meeting at 8:00 p.m. Prior to the meeting Mr. Hallowell was conducted on a tour of the Bullard Machine Tool Co. by Eugene Grumman, Bullard's director of quality control. Here Mr. Hallowell inspected the latest quality control techniques in use at the plant.

The section was happy to present Mr. Hallowell for their Annual Management Night. He is well known as a speaker and writer on management subjects and an authority on quality control. In successfully managing his company through many phases of operation, he has

applied capital investment as a continuing policy to boost production and wages while holding consumer prices down. Mr. Hallowell's topic was "Top Management's Views On Quality Control." The meeting was exceptionally well attended and prominent members of local industries were noted throughout the audience.

SOUTHERN TIER The Southern Tier Section held its monthly dinner meeting at the American Legion Clubhouse in Vestal, N. Y. on Nov. 9. A total of 80 members and guests enjoyed a fine roast beef dinner and a highly interesting after-dinner talk by Leonard A. Seder. Mr. Seder's subject was "Process Capability Analysis."

STATE UNIVERSITY OF IOWA Professor Allen Craig of the University of Iowa Department of Mathematics was the speaker at the November meeting of the Quint-City group. Forty-five persons enjoyed the dinner at the Lend-A-Hand Club in Davenport, followed by Professor Craig's talk on the subject, "Some Aspects of Statistical Inference."

SYRACUSE Frank Winnie, statistical quality supervisor at Oberdorfer Foundry in Syracuse, presented an interesting talk on "Statistical Quality Control in the Foundry" on Nov. 23. His presentation covered the development and administration of statistical quality control techniques in the foundry.

TORONTO On Nov. 10 D. B. Delury of the Ontario Research Foundation was the speaker in Toronto. The subject "Design of Experiments" was developed by outlining some preparatory phases by scientists as applied to quality control. Later the results of these experiments were interpreted by Dr. Delury who capably presented the difficult topic.

TRENTON On Nov. 5 the Trenton Section had a large turn out to hear Mason E. Wescott, professor of applied statistics, Rutgers University, lecture on "SQC and U." He used colorful gadgets to illustrate his talk. At the conclusion of the demonstration, informal discussion was held over quality beer and pretzels.

WASHINGTON The Washington-Baltimore Sections held their annual one day conference on Nov. 19, at the Student Union Building of the University of Maryland. The theme of the program was "Quality Control—the Key for a Better Product at Less Cost." The featured luncheon speaker was Maj. Gen. Leslie E. Simon who spoke on "Quality Control—A Management Tool." The titles of the three panels were: (1) Management Profits With Statistics; (2) Tools and Techniques of Quality Control; (3) Procurement with Confidence.

WESTERN MASSACHUSETTS The Nov. 23 meeting was held at Rovelli's Restaurant, Springfield, Mass. Charles J. Bicking, Office of the Chief of Ordnance, discussed the subject "Statistical Experimentation in the Chemical Industry." Mr. Bicking spent considerable time discussing the approach to problems of control in the

Unscrambles Metal Mixups

THE CYCLOGRAPH. This instrument permits truly high speed, nondestructive sorting of raw, semi-finished or finished parts by their metallurgical characteristics. With the new Automatic Sorter Unit speeds up to 300 pieces per minute are possible with the use of suitable feeding equipment. Used by leading industrial firms everywhere.

J. W. DICE CO., Englewood 8, New Jersey

Non-destructive Testing and Measuring Instruments

See DoALL'S New PRODUCTO-CHEK Mechanical Comparator

- Low Cost
- Extreme Accuracy
- Speeds Inspection
- Direct Reading
- Reduces Error
- No gears, lever, racks.

For a demonstration, see yellow directory for DoALL Sales Service Store that stocks complete line of gaging specialties.

.0001", .00005" and .000010" gaging heads.

Call Your DoALL Service-Store

Machine Tools Cutting Tools Measuring Instruments Shop Supplies In Stock

The DoALL Company, Des Plaines, Ill.

chemical field and supplemented his talk with three different examples illustrating methods of significance testing and designing experiments.

WICHITA The Wichita Section met on Nov. 2 at the Pastime, and Vice-Chairman Earle Miller asked guests to introduce themselves. He then reported the section's progress in the Section Management competition. The program, consisting of five films, was presented by Program Chairman Ed Sullivan. The first two, on sampling and process controls, had to do with military specifications. The third was a Caterpillar Tractor film on safety. A. L. Hoppe of the Optical Gaging Products, Inc., commented on and answered questions concerning the film on optical gaging. The final film, entitled "Gaging for Profit," was sponsored by Federal Products.

WINNEBAGO As one of his last official acts, President R. S. Saddoris presented the Winnebago Section with its charter at the Nov. 1 meeting. "Not Quite Statistical Sampling," was the subject of the talk given by Dale E. Cue, A. O. Smith Corp., who was the guest speaker at the meeting.

YOUNGSTOWN F. C. Schulze, Hunter Spring Co., presented a series of slides to show how his company used frequency distributions to reduce scrap and keep quality at a high level. Both the dinner and the meeting were well attended and considerable interest shown by the number of questions asked.

"... CAST THEIR SHADOWS BEFORE"

ALLENTOWN -BETHLEHEM Dale L. Lobsinger will present his talk on "Some Administrative Uses of SQC at United Airlines" to this section at Hotel Traylor on Feb. 10.

BUZZARDS BAY Robert R. Jones, quality control manager, Bigelow-Sanford Carpet Co., Amsterdam, N. Y., will address the Feb. 8 meeting. Mr. Jones will speak on "Quality Mindedness."

HUNTSVILLE The Feb. 16 meeting of the Huntsville Section will be clinic night. Mathew Weber, chief statistical engineer, Thiokol Chemical Corp., will be the moderator. Each member will be asked to submit from his own experiences a problem in quality control for discussion.

INDIANAPOLIS On Feb. 15, 1955, the Indianapolis Section will start the day's program with a meeting at 4:30 p.m. in the World War Memorial Bldg. This will be a chalk talk by Charles Hicks of Purdue University. At 7:30 p.m. in the Indiana State Board of Health Bldg., a past member and Vice-President of the Indianapolis Section, Dale Cue, A. O. Smith Corp., Milwaukee, will address the section. His subject will be "Not Quite Statistical Sampling." The Indianapolis Section members are looking forward to his presentation and return visit.

COMTORPLUG

PRECISION INTERNAL GAGE

Used by the thousands in the Jet Engine and Automatic Transmission programs

GAGES PRECISION HOLES TO FRACTIONS OF .0001"

Discover Comtorplug and learn how easy it is to install Precision Internal Gaging: at machine, bench, lab. In an hour you can install this "Packaged Precision" without special operator training and with no need for electronics, wiring, air hose and such gimmicks. Uniform precision in use is assured by automatic features unique in Comtorplug. It gages holes from ⅛" to 8" dia. . . . with long inreaches available as needed. Unique 2-point gaging detects front or back taper, out-of-round, bell mouth, barrel shape, etc., and SHOWS EXACT SIZE —not just go or no-go. Get the exciting story by writing to Comtor Company, 80 Farwell St., Waltham 54, Mass.

SEND FOR BULLETIN NO. 48

COMTOR COMPANY REPRESENTATIVES

BARWOOD & COMPANY
3137 North 15th Street
Philadelphia 32, Pa.

DOLPH BOETTLER COMPANY
6625 Delmar Blvd.
St. Louis 5, Missouri

GERALD B. DUFF & COMPANY
68 Clinton Avenue
Newark 5, New Jersey

LOUIE A. GAIN
1544 Spruce Street
Berkeley, California

F. D. HUNTINGTON CO.
9101 East Jefferson Ave.
Detroit 14, Michigan

WALTER R. OLT
306 Abingdon Road
Dayton 9, Ohio

HAROLD E. SUNDBERG
Ellicott Square
Buffalo 3, New York

CONANT BROACH COMPANY
347 West 107th Street
Chicago 28, Illinois

GERHART M. COOKE
4760 East Olympic Blvd.
Los Angeles 22, California

L. D. SUPPLY COMPANY
436 Maple Street
Wichita, Kansas

M. L. LEVIS
Fairview Park
4595 West 214th Street
Cleveland 26, Ohio

PROCTOR & MARTIN CO., INC.
297 Franklin Street
Boston, Mass.

SEVERANCE TOOLS OF CANADA, LTD.
1232 Eglinton Avenue West
Toronto, Ontario, Canada

ENGINEERING SALES COMPANY
112 Portwood Street
Houston, Texas
and
1905 S. Harwood
Dallas, Texas

INDIANAPOLIS
Lafayette Sub-Section The next meeting of the Lafayette Sub-Section will be on Jan. 19, 1955. The speaker will be I. W. Burr, Purdue University, who will discuss the different quality control applications.

INDIANAPOLIS
Richond Sub-Section On Jan. 26 a dinner meeting is being planned. Each member is to invite some member of management from his plant. The speaker will talk on the "Benefits of the SQC Organization."

MICHIGAN One of the highlights of every Michigan Section season is our yearly dinner meeting and dance. This affords the wives of the section members to see what their husbands do on those nights when they have "gone to the ASQC meeting." This year's dinner and dance will spotlight the section chairman, Herman H. Bogin, who will show us "Probability as a Pastime."

MINNESOTA The next regular monthly meeting of the Minnesota Section will be held on Jan. 31, 1955. The principal speaker of the evening will be Irving W. Burr of Purdue University. The subject of his talk will be "Short Runs."

MONTREAL The guest speaker at the Feb. 16 meeting of the Montreal Section will be E. Polidor, Optical Gaging Products, Rochester, N. Y., who will talk on the subject of optical gaging. The meeting will be held at McGill University; starting time 8:15 p.m.

STELCO
THE MARK OF QUALITY

Canada's Foremost Steel Producer

acknowledges the considerable benefits derived from membership in the

AMERICAN SOCIETY FOR QUALITY CONTROL.

Rigid control of quality has ever been a prime factor in the superiority of Stelco's steel and steel products.

THE STEEL COMPANY OF CANADA, LIMITED
HAMILTON, Ontario • MONTREAL, Quebec

NEW HAVEN The next regular meeting of the New Haven Section will be held on Jan. 25, 1955. This will be a joint meeting with the Society for the Advancement of Management. The scheduled speaker will be W. M. Biklen, American Safety Razor Co., who will present the subject "Incentives and QC—Progressive Management Needs Both."

RICHMOND The Richmond Section is fortunate in having Acheson J. Duncan, associate professor of statistics, The Johns Hopkins University, as its speaker for the meeting on Jan. 25. Subject—"The Design of Control Charts." Dr. Duncan is well-known in ASQC and is author of the useful text *Quality Control and Industrial Statistics.*

ST. LOUIS The January meeting will be addressed by Irving W. Burr of Purdue University. He will speak to the St. Louis Section on the subject, "An Engineer Continues His Learning of Statistics in Quality Control." Everyone is familiar with Dr. Burr's method of presentation and we are looking forward to be a pleasant evening at that time.

SCRANTON -WILKES BARRE Steve Malaker, Daystrom Instrument Div., will discuss on Wednesday, Jan. 27, 1955 statistical quality control and its application in the field of atomic energy.

SEATTLE Carl A. Bennett, Applied Mathematics Group, General Electric Company, Richland, Wash., will be the speaker at the Feb. 8 meeting of Seattle Section. His topic will be "Recent Advances in the Design and Analysis of Industrial Experiments" and is sure to be of primary interest to members because of the vast knowledge of Dr. Bennett in this field.

SOUTH BEND -MISHAWAKA The January meeting will feature a combination panel and open forum is which various tools used in statistical quality control will be discussed and demonstrated. D. E. VanHine, quality manager, United States Rubber Co., Fort Wayne, will use these gadgets to illustrate a constant cause system. L. R. Welty will be the moderator.

Ladies Night will be the feature of our February dinner meeting, with a program of special interest to the wives being planned.

SOUTHERN CONNECTICUT The Southern Connecticut Section will present E. F. Gibian, Thompson Products, at its Feb. 9 meeting in the Stratfield Hotel, Bridgeport. The subject of Mr. Gibian's talk is "Engineering Applications of Statistical Quality Control Techniques." Mr. Gibian has a wide background in industrial engineering, methods engineering and quality control. He is an authoritative speaker on this subject and has handled SAE production forums in Chicago. This meeting has been planned especially in the interests of methods men, design engineers and all quality control men.

SOUTHERN TIER The February meeting of the Southern Tier Section is to be a joint meeting with the local chapter of ASTE. The dinner meeting will be held on Feb. 1 at the Amer-

ican Legion Clubhouse in Vestal, N. Y. The feature of the meeting will be the DoALL Co. exhibit, "Civilization Through Tools," which is sure to be of interest to everyone attending.

STATE UNIVERSITY OF IOWA The next section meeting will be a one-day affair to be held Jan. 21, 1955 at the Savory Hotel in Des Moines, Iowa instead of the customary two-day meeting. The session will include technical papers by some outstanding speakers and the usual problems clinic.

SYRACUSE George Armour, of General Electric Company, Syracuse, will preside over a symposium on the use of punch-card methods in quality control on Jan. 25, 1955.

TORONTO Jan. 26 will be another film and technical discussion period when the members "hash out" particular problems at simultaneous meetings held in Hamilton and Toronto.

TRENTON On Feb. 4, Friday evening, Leo Jacobson, manager quality control dept., International Resistance Co. will be the guest speaker before the Trenton Section. Subject of discussion—"Machine Capabilities." Social hour with refreshments at the conclusion of the meeting.

WESTERN MASSACHUSETTS This section will not hold a scheduled meeting during the months of January or February. However, during this period the intermediate part of our educational program will get started and also during this period we expect to spend considerable time in developing the one day clinic on Experimental Design to be held in March.

WICHITA The February meeting of Wichita Section will feature Dale Lobsinger, superintendent of quality control, United Airlines, who will speak on the subject: "Air Transportation Finds New Uses for Quality Control." This interesting subject and presentation should arouse widespread interest and perhaps will answer a few of the questions on how the air lines operate so efficiently, and how they have achieved their enviable safety record.

"AS YE SOW . . ."

CINCINNATI The Cincinnati Section will conduct its Fourth Annual Quality Control Conference on Saturday, Jan. 29, at the Engineering Society Building on East McMillan St. The theme will be "Organizing for Quality," which is felt to be particularly pertinent to management problems today. The speakers will be:

G. E. Fouch—General Electric Co., Cincinnati
Dr. E. E. Olds—Carnegie Tech., Pittsburgh
Dorian Shainin—Rath & Strong, Boston

and a panel group consisting of:

Dr. J. M. Juran—New York University, N. Y.
L. R. Zimov—AVCO, Cincinnati
W. W. Carter—Formica, Cincinnati
Enoch While—Alice-Chalmers, Cincinnati

The Society Operating and Executive Committees will be meeting in Cincinnati at the time of the conference, and have been invited to attend the conference and luncheon as guests of the Cincinnati Section.

For further information write H. D. Birch, Conference General Chairman, General Electric Co., Cincinnati 15, Ohio.

NEW YORK QC COURSE An intensive 8-day course in SQC will be held at the Hotel Lexington in New York City from Mar. 18-26. This course will provide instruction in control charts and sampling acceptance procedures, along with practical applications of the methods.

For information concerning the course, contact Ralph E. Wareham and Associates, Consultants on Quality Control, 122 Orchard Ridge, Chappaqua, N. Y.

ST. LOUIS The St. Louis Section is planning an advanced course using as the basis for instruction case histories, which will begin on Feb. 7 and carry through for eight specific sessions. Dr. Vezeau of St. Louis University and Joseph Movshin, Ramsey Corp., will be the chief instructors. They will be supplemented by members of the St. Louis Section who have had experience in actual plant or process operation. These sessions will be essentially "round table discussions" to help those who have just finished the basic course to install and carry out to a better advantage the knowledge gained in the previous course, and of course this advanced course will be open to all members in the St. Louis area.

INLAND AUTOMATIC, INC.

Subsidiary

Inland Manufacturing Company

SOLVE YOUR VENDOR QUALITY PROBLEM

AUTOMATIC SCREW MACHINE PARTS

Precisely to Print

Delivery On Time

A Q L CERTIFICATION WITH EACH LOT

Write, Wire or Call Sam L. Grasso

1108 Jackson St. **Phone: Jackson 1108**

Omaha 8, Nebraska

CALENDAR OF MEETINGS — JANUARY 20, 1955 — FEBRUARY 19, 1955

*Indicates meeting dates in January

SECTION	DATE	MEETING PLACE	TIME	SUBJECT	SPEAKER
Allentown-Bethlehem	7	Hotel Traylor	———	Some Administrative Uses of SQC at United Airlines	D. L. Lobsinger, United Airlines
Boston	15	———	———	Application of Statistics in the Food Industry	Irving S. Fagerson, University of Massachusetts
Buffalo	31*	Yerkes Plant, Du Pont Co.	———	Application of Statistics at the Yerkes Plant	DuPont Staff
Buzzards Bay	8	———	———	Quality Mindedness	R. R. Jones, Begelow-Sanford Carpet Co.
Cincinnati	29*	Engineering Society Building	———	All-Day Conference: Organizing for Quality	———
Columbus	16	———	———	Production and Inventory Control	W. F. Hoehing, Westinghouse Electric Corp.
Dayton	20*	Delco Products Plant	———	QC Applications on Large Motors and Generators	Leo Nartker, Delco Products Div., GMC
	17	Annarino's — 2826 N. Dixie Dr.	———	The Advantages of the Use of Statistical Methods	Leon Bass, General Electric Co.
Delaware	3	———	———	Statistics in Engineering Development and Research	E. R. Ott, Rutgers University
Evansville-Owensboro	15	Servel, Inc.	7:15 p.m.	———	J. L. Dolby, General Electric Co.
Harrisburg	2	Olmstead AFB — Middletown	———	Selling QC to the Factory	Burr Stanton, General Electric Co.
Huntsville	16	———	———	Extreme Values	William Harrell, Thiokol Chemical Corp.
Indianapolis	15	World War Memorial, East Room	4:00 p.m.	Not Quite Statistical Sampling	D. E. Cue, A. O. Smith Corp.
Kansas	9	Pine Room, Union Station	7:00 p.m.	Quality Control Problems	Panel Discussion
Lansdale	10	———	———	———	E. H. Robinson, Johnson & Johnson
Los Angeles	10	———	———	Selling Quality Control to Vendors	J. B. Buehler, North American Aviation
Michigan	18	Rackham Building, Detroit	———	How the Union Looks at Quality Control	William Gomberg, Int. Ladies' Garment Workers
Minnesota	31*	———	———	Short Runs	Irving Burr, Purdue University
Montreal	16	———	———	Optical Gaging	E. Polidor, Optical Gaging Products
New Haven	25*	———	———	Incentives and QC—Progressive Mgmt. Needs Both	W. M. Biklen, American Safety Razor
NE Indiana	10	———	———	Practical Application of Work Sampling	R. J. Pielsticker, International Harvester Co.
Philadelphia	21*	Franklin Institute, 20th & Parkway	8:00 p.m.	Rank Order Statistics	R. A. Bradley, Virginia Polytechnic Inst.
	18	Franklin Institute, 20th & Parkway	6:30 p.m.	Quality Control Looks at Operations Research	P. S. Olmstead, Bell Telephone Lab.
Rhode Island	20*	Providence Engineering Hall	———	Use of Medians and Mid-Ranges	E. B. Ferrell, Bell Telephone Lab.
	17	Providence Engineering Hall	———	Meet the Quality Control Engineer	W. R. Purcell, Rath and Strong, Inc.
Richmond	25*	Holloway House	6:15 p.m.	The Design of Control Charts	A. J. Duncan, The John Hopkins University
St. Louis	21*	———	———	An Engineer Continues His Learning of Statistics in QC	I. W. Burr, Purdue University
San Diego	14	Solar Auditorium	7:30 p.m.	Victory Through Experimental QC	L. W. Ball, Wylie Laboratories
Scranton-Wilkes-Barre	27*	———	———	SQC and Its Application in the Field of Atomic Energy	Steve Malaker, Daystrom Instrument Div.
Seattle	8	———	———	Recent Advances in Design & Analysis of Indus'l Expmts.	C. A. Bennet, General Electric Co.
South Bend-Mishawaka	20*	Notre Dame University	7:30 p.m.	Open Forum	———
	17	———	———	Dinner Meeting, Ladies' Night	———
Southern Connecticut	9	Stratfield Hotel, Bridgeport	———	Engineering Applications of SQC Techniques	E. F. Gibian, Thompson Products, Inc.
Southern Tier	1	American Legion Clubhouse, Vestal	———	Civilization Through Tools—DoALL Exhibit	———
State Univ. of Iowa	21*	Hotel Savery, Des Moines	8:30 a.m.	One-Day Meeting	G. G. Parkin and E. C. Varnum
Syracuse	25*	———	———	Symposium on Use of Punch Card Methods in QC	George Armour, General Electric Co.
Toledo	20*	———	———	Panel Discussion	R. K. Mattimore, The DeVilbiss Co.
	17	———	———	To Be Announced	J. B. Schneider, Toledo Stamping & Mfg. Co.
Toronto	26*	———	———	Film and Technical Discussion	———
Trenton	4	Trenton Technical Institute	———	Machine Capabilities	Leo Jacobson, International Resistance Co.
Washington	26*	———	———	Cooperation Between Purchasing and QC	Panel Discussion
Wichita	,	———	———	Air Transportation Finds New Uses for QC	D. L. Lobsinger, United Airlines
Winnebago	7	Oshkosh, Wis.	———	Decisions with Calculated Risks	G. W. McElrath, University of Minnesota
Worcester	20*	———	———	Budgeting Rejections	W. H. Perks, Norton Co.
	17	———	———	Quality Control of Metal Sampling	F. C. Schulze, Hunter Spring Co.
Youngstown	10	———	———	Span Plan	L. A. Seder, QC Consultant

SALT LAKE CITY This section in cooperation with the College of Business, University of Utah announces a three month course on Industrial Quality Control starting January 1955.

SEATTLE The Seattle Section is earnestly preparing for the 3rd Pacific Northwest Conference which is to be combined with the 2nd Western Region Conference scheduled to be held at the Benjamin Franklin Hotel, Mar. 17, 18, 19, 1955. One feature of the Conference will be an all-day course to be held Thursday, Mar. 17.

SOUTHERN TIER The Southern Tier Section and the Endicott Public School Adult Education Division are sponsoring a course, "Elementary Statistical Quality Control" during the spring term. Sessions will be held once weekly for a period of 12 weeks at the Union-Endicott High School in Endicott. The course is being offered in answer to a demand from various industrial organizations within the Triple City area of Binghamton, Johnson City and Endicott. Section members who will serve as instructors are I. Glenn Stevenson, Ansco Corp., H. A. Stevens, Ansco, Corp., I. C. Kepner, IBM Corp., and Charles Rubin, General Electric Co.

TORONTO WICHITA The Toronto Section is busily planning for the great event. What event? Why, the 2nd All-Day Forum, of course. Mark up the month of February so you will be sure to remember the beginning of the Wichita training course entitled "Principals of Quality Control." Phases of quality control that have received little attention, such as "Psychological Aids to Quality Control," will be stressed in the course. Competent instructors from the major aircraft companies in the "Air Capitol" will be obtained.

"FOR MANY ARE CALLED, BUT FEW ARE . . ."

SALT LAKE CITY Robert A. Cromar, Secretary of the section was recently transferred to the Denver Operations of United Airlines. Vice chairman of the section, William A. Hoagland, will take over the secretary's duties on a temporary basis.

SOUTH BEND -MISHAWAKA C. M. Makowski, Oliver Corp., has been appointed secretary to fill the vacancy left by Neil Hoesel who has accepted a position with General Motors Corp. in Flint, Mich.

TEXTILE DIVISION

The Fifth Annual Textile Quality Control Conference, sponsored by the Textile Division, is being held at Clemson, S. C. on Jan. 27, 28, 29, 1955. The program for this conference includes mill tours, technical papers, educational sessions, and a banquet. The complete program follows:

Thursday, January 27

Afternoon—Mill and College Tours
Evening—Registration—The Clemson House
Get Together—Lounge of The Clemson House

More and Finer Products at LOWER UNIT COSTS!

HOW TO INSTITUTE QUALITY CONTROL AS AN OPERATING PROCEDURE—using

R. G. Bock P. Q. Scopes with the Quality Index of Standard Conformity.

●

A completely NEW Outline of Practice available to Quality Control and Operating Executives upon request . . . address

R. G. Bock Engineers
Industrial Management Consultants
1937 Irving Park Road, Chicago 13, Illinois

(Our organization also renders a consulting Service to Industry in instituting Statistical Methods of Quality Control.)

Friday, January 28

8:30 Registration

9:00–
9:15 Opening Remarks .....Chairman Dame S. Hamby
School of Textiles, N. C. State College
Welcome.....Hugh M. Brown
Dean, School of Textiles, Clemson College

9:15–
12:00 Theme: Quality Control and the Human Factor
Moderator: Stephen I. Rudo, Werner Textile Consultants, New York
Quality and Management.....J. A. Fife
Superintendent, Scottdale Mills, Scottdale, Georgia
Quality and Mill Personnel.....P. H. Burrus, Jr.
Vice President and General Manager, Jackson Mills, Wellford, S. C.
Quality and The Consumer.....L. A. Fluck
Manager, American Cyanamid Company, Textile Resin Department, Bound Brook, N. J.

2:00–
5:00 Theme: Quality Control and Industrial Engineering
Moderator: K. K. Edgar, Henderson Lindsay and Michaels, Inc., Management Consultants, Greenville, S. C.
Use of S.Q.C. to Set Conditions for Work Loads .....H. Elliott Foster
Henderson, Lindsay and Michaels, Inc.
Control Concept Applied to Production Planning and Sales Activities .....Donald Deming
Southern Shuttles Division of Steel Heddle Mfg. Co., Greenville, S. C.
Relationship and Applications of SQC to Industrial Engineering R. N. Lehrer and Joseph J. Moder, Jr.
School of Industrial Engineering, Georgia Institute of Technology, Atlanta, Georgia

6:15–
7:00 Social Hour .....The Clemson House
7:00 Annual Banquet .....The Clemson House

Saturday, January 29

9:00–
10:30 Theme: Quality Control in Testing and Research
Moderator: H. K. Hughes, Summit Research Lab., Celanese Corp. of America
Control of Tire Cord Testing.....F. Akutowicz
American Viscose Corp., Marcus Hook, Penn.
Evaluation of Evenness Testers.....W. T. Waters
School of Textiles, N. C. State College, Raleigh, N. C.

10:30–
12:30 Task Group Meetings

2:00–
4:00 Theme: Quality Control in Processing
Moderator: Samuel B. King, Limestone Mfg. Company, Gaffney, S. C.
Process Controls .....Norbert L. Enrich
Institute of Textile Technology, Charlottesville, Va.
Carding and Spinning Process as Related to Quality .....Joe Delaney
Superintendent, Joanna Cotton Mills, Joanna, S. C.
Quality Is Our Problem.....W. H. Esslinger
Quality Control Coordinator, Central Mill Office, M. Lowenstein and Sons, Anderson, S. C.

For further information and registration forms, write to: R. G. Carson, Jr., Textile School, Clemson, S. C.

QUALITY CONTROL POSITIONS

available with

CELANESE

at each of these locations:

AMCELLE	CELCO	CELRIVER
near Cumberland, Md.	near Roanoke, Va.	near Charlotte, N. C.

1. Assistant Quality Control Superintendent, requiring degree in Chemistry, Chemical Engineering or Textile Engineering, age 35 to 45, with broad experience in quality control work, preferably in the textile field, including some administrative or supervisory experience.
2. Degree in Chemistry, Chemical Engineering, Physics or Textile Engineering, age 25 to 35, with up to 5 years experience in quality control or statistics.
3. Degree in Chemistry, Chemical Engineering or Textile Engineering with a strong background in applied statistics, particularly experience in design and recent advances in optimization.

These openings are in a company with an outstanding record of growth and achievement in an increasingly important field: the production of acetate yarns and fibres. As a young organization (just 30 years old) Celanese provides an opportunity for professional growth and advancement in its expanding operation.

If your background qualifies you in one of the above listings, send a complete resume, indicating the location of your preference and your salary requirements, to Mr. W. T. Marx.

Celanese Corp. of America

180 Madison Ave. New York, N. Y.

3-D MAGNIFICATION
For Inspection and Small Assembly Work
with Bausch & Lomb Stereomicroscopes
Three dimensional vision
Unreversed image
Speeds work
Requires less skill
Consult your yellow Directory for location of nearest of the thirty-eight DoALL Sales-Service Stores that stock complete metal working necessities.
Makes little parts look big!
Call Your DoALL Service-Store
Machine Tools
Cutting Tools
Measuring Instruments
Shop Supplies
In Stock
The DoALL Company, Des Plaines, Ill.
12

American Society News

The Milwaukee Section showed among other things of good quality, its ability to be an excellent host to the Society Officers and Directors. On Oct. 20, 1954, it held its traditional "Industrial Clinic." But it opened Milwaukee's gates to the Society Operating and Executive Committees on the preceding day. That meeting, at the Hotel Wisconsin, started at 8:55 a.m. and at 2:15 a.m. on Oct. 20th your Officers and Executive Directors began to wonder if hamburgers and coffee could be found to reinforce them for two things—the One-Day Clinic and the mid-fiscal-year meeting of the Board of Directors.

OPERATING AND EXECUTIVE COMMITTEE

Here is a brief summary of what built up those appetites: The membership of the Nominating Committee, which will submit to the membership its suggestions for the Officers for 1955-56, will consist of:

A. C. Richmond, Chairman
A. L. Davis — W. H. Lewis
M. B. Gwynn — A. B. Mundel
Norman Kravitz — L. A. Seder

A new publication plan for our journal, *Industrial Quality Control* was approved. It involves:

1. Changing from a bimonthly to a monthly publication starting with the January 1955 issue.
2. Retaining the services of two advertising sales representatives. Our sharp eyed readers will have noticed the new names on the masthead page of the November 1954 issue, Bob Weston and L. B. Hammond.
3. Bringing advertising rates and institutional subscription rates more into line with the increased demand, which has come along with the steady growth of membership ever since our start.

The continual strengthening of divisions, and the transition of certain industry steering committees and technical committees into divisions was outlined in a detailed plan approved by the Executive Committee. These details are now being considered by these technical committees,

Administrative Applications
Aircraft
Electronics
Metals

to determine their eligibility to become divisions of ASQC, and so join the masthead listing of the Society's present two divisions—Chemical and Textile.

Being considered are such plans as setting aside space in IQC each month for Division news, listing in the yearbook a member's Division affiliation (if any), and allocating a full morning or afternoon at Society Annual Conventions to each division as its complete responsibility to include division papers and the annual meeting of the division. Among other things a division serves the particular interests of ASQC members of given industries, and can do it well through such freedom of activity as brought about by having its own funds and electing its own officers. Steering committees, which survey the potential for such groups in an industry or in a particular common activity among industries, are being organized under Vice President Julian H. Toulouse.

In ASQC's stock list of available publications on Quality Control (P. 64, Sept., 1954, IQC) has been an effective but elementary Volume I, "What and Why". At this meeting the Executive Committee approved the purchase of a stock of Volume II, "Highway Markers to Better Quality." These two manuals were prepared by the National Screw Machine Products Association in cooperation with ASQC.

BOARD OF DIRECTORS

Three important subjects involving Amendments to the Society's By-Laws had been held up for further study at the previous Board Meeting at St. Louis. They were brought to a stage by the Executive Committee, in one case, and by a special committee of Mason Wescott, Charles Bicking, and George Edwards, in the other two, where the Board could with little or no further change approve them.

One amendment affected advertising policy in IQC, and the other two spelled out the duties and power of the Shewhart Medal and Brumbaugh Award Committees.

Considerable discussion took place about the Society's investment fund. The Board unanimously approved the principle of having a securities investment program, and a subsequent vote was 17 to 3 in favor of following the detailed written recommendations of the Financial Advisory Committee concerning certain restrictions on the operation of the program and the method of control of such activities by the Executive Committee. During this discussion two motions were made and seconded, but defeated when voted. One proposed a smaller maximum allowable proportion of common stocks, and the other proposed that only investments in U. S. Government Securities would be permitted.

For some time now it has been clear that the rather rapid growth

Over 85% of the torque wrenches used in industry are
STURTEVANT
TORQUE WRENCHES
Read by Sight, Sound or Feel.
● Permanently Accurate
● Practically Indestructible
● Faster—Easier to use
● Automatic Release
● All Capacities
in inch grams... inch ounces,.. inch pounds ...foot pounds (All sizes from 0-6000 ft. lbs.)
TORQUE MANUAL
Every manufacturer, design and production man should have this valuable data. Sent upon request.
PA STURTEVANT CO
ADDISON QUALITY ILLINOIS

of the Society has resulted, and will continue to result in an initiation of new sections in areas not anticipated at the time the first section in those areas was formed. As a result we have sections with an area or a district name (sometimes even a state name) and new sections also have been formed in that same area or district. Accordingly, two Society policies are in effect: (1) only to accept new sections with a town or city name, and (2) to encourage existing sections voluntarily to change their name if it does not so comply. The most recent such change was Rock River Valley to Rockford. The matter was discussed at this meeting, with the request that the Directors help through their contacts to explain the need for further such changes.

* * *

"We just heard about a fellow who believed in statistics. He was drowned while crossing a river which had an average depth of four feet, six and one-half inches."

HYDRAULICS ENGINEER

Nationally-known Chicago manufacturer requires man, 24-35, to design and test hydraulic components and adaptations. Engineering degree preferred, but not required. Broad knowledge of hydraulics theory, design, and schematics necessary, as well as 3-5 years in hydraulic testing and/or manufacturing. Real opportunity for qualified man.

Please send resume of education, experience, salary requirements to Box 11K1, American Society for Quality Control, Room 563, 50 Church St., New York 7, N. Y.

Note on "Investigation of Latin Squares," by Frank Proschan appearing in the July 1954 issue of IQC.

It should be emphasized that the Latin square design should be used only if it is known that there is no interaction between the factors under study. Otherwise, if interaction is present, it may appear disguised as the main effect of one of the factors, thus leading to an incorrect interpretation of the data.

POSITIONS AVAILABLE

Address all replies to box number references to: American Society for Quality Control Room 563, 50 Church Street, New York 7, N. Y.

QUALITY CONTROL

To install and administer complete quality control program for new floor covering plant in Southeast. Engineering degree and some experience required in application of statistical quality control procedures to textiles.

Please reply to Box 11K2 at the above address.

WANTED

Quality Control Engineer

Degree in M.E., E.E., or mathematics. Industrial experience desired, familiarity with statistical quality control techniques essential. Please send complete resumé to:

Professional Employment
DIVISION QC-1
SANDIA CORPORATION
Sandia Base
Albuquerque, N.M.

POSITIONS WANTED

Address all replies to box number references to: American Society for Quality Control Room 563, 50 Church Street, New York 7, N. Y.

QUALITY CONTROL ENGINEER—Age 28; seven years experience in organizing and supervising of quality control program in an industrial manufacturing concern. Have coordinated engineering standards and specifications to effect product improvement. Experienced in training samplers on the job in the use of statistical techniques. Have set up quality control procedures for metal stamping, plastic moulding, and packaging materials. Please reply to Box 11D1 at the above address.

CONSULTING SERVICES

Responsibility of the American Society for Quality Control, Inc., for Consulting Services advertising is limited to certification that advertisers hold the grade of membership in the Society stated in their advertisements. Qualification requirements for the several grades of membership are set forth in the Constitution of the Society.

Management Controls
FOUNDED IN 1941
References and Literature on Request
Senior Partner: 699 Rose Ave.
W. E. JONES DES PLAINES, ILL.
Fellow, ASQC *Vanderbilt* 4-6533

Consulting Services in Quality Control
RALPH E. WAREHAM
Fellow, ASQC
122 Orchard Ridge Telephone
Chappaqua, New York Chappaqua 1-0715

Quality Control Consultant
HARMON S. BAYER
Senior Member ASQC
1154 Book Building Telephone
Detroit 26, Michigan WOodward 5-3796

QC Planning Defect Prevention
LEONARD A. SEDER
FELLOW, ASQC
267 HAWTHORNE ST.
MALDEN, MASS.
MAlden 4-5446
Organizing for Quality Training

Mechanical - Management - Electronic
Process - Design - Quality Control
Investigations - Appraisals - Reports
JOHN I. THOMPSON & COMPANY
ENGINEERS
921 17th St. NW, Washington 6, D.C.
O. F. Keuler, Jr., Vice-President
Senior Member, ASQC
Laboratory Division: Bellefonte, Pa.

Statistical Methods Inspection Surveys
BERNARD HECHT
Quality Control Specialist
Serving Industry on East and West Coast Areas
Senior Founding Member ASQC
New Eastern Office Western Office
Suite 249 5410 Wilshire Blvd.
2480 16th St. N.W. Los Angeles 36, Calif.
Washington 9, D.C. WE 0121
ADams 4-6711

It Pays to Purchase Quality-Controlled Products from IQC Advertisers
\- - -
When Replying to Ads Please Mention IQC

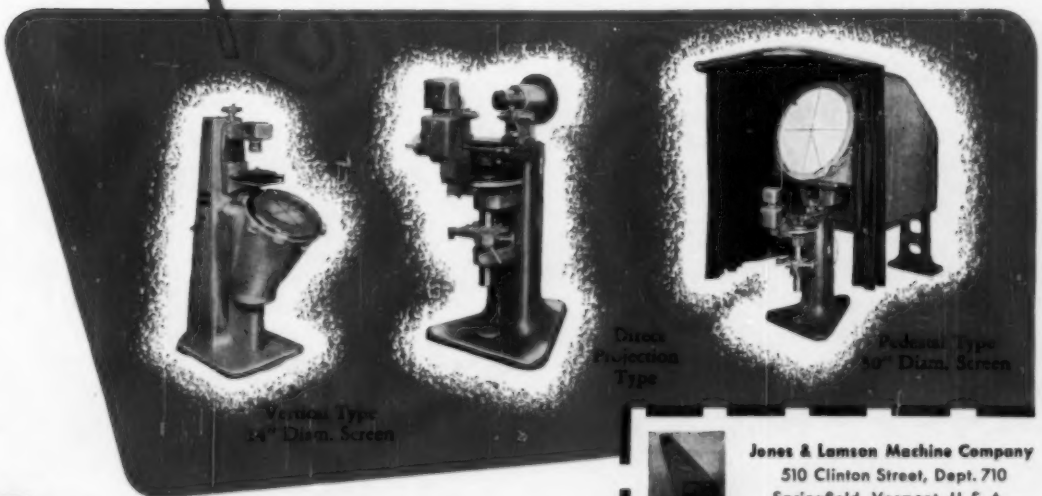
Unsurpassed Inspection Versatility

JONES & LAMSON OPTICAL COMPARATORS

The Essence of Quality Control

Jones & Lamson Optical Comparators are designed and built like rugged machine tools to withstand vibration and hard use. Yet they have the built-in accuracy to satisfy the most exacting laboratory standards.

- **They meet** the requirements of toolroom, laboratory and production inspection.
- **They precisely measure** height, depth, lead or spacing, as well as angles to degrees and minutes. They will measure to .0001".
- **They compare** intricately contoured parts with a master outline—and measure the amount of error.
- **They are convenient** to operate, easy to set up and read direct—*without computation.*
- **They operate** under normal lighting conditions. *No darkroom is needed.*
- **They will photograph** the enlarged shadow and record its relationship to a master chart.
- **Several persons** may study the shadow *at the same time.*
- **They will inspect** and measure surface contours, as well as profiles of objects such as type faces, stamping dies, punches, worn tools, etc.



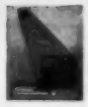
P.S. → A complete line of STANDARD CHARTS and FIXTURES is maintained by us.

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE COMPANY
510 Clinton St., Springfield, Vt., U.S.A.

COMPARATOR DIV.
Dept. 710



Jones & Lamson Machine Company
510 Clinton Street, Dept. 710
Springfield, Vermont, U. S. A.
Please send Comparator Catalog No. 402.

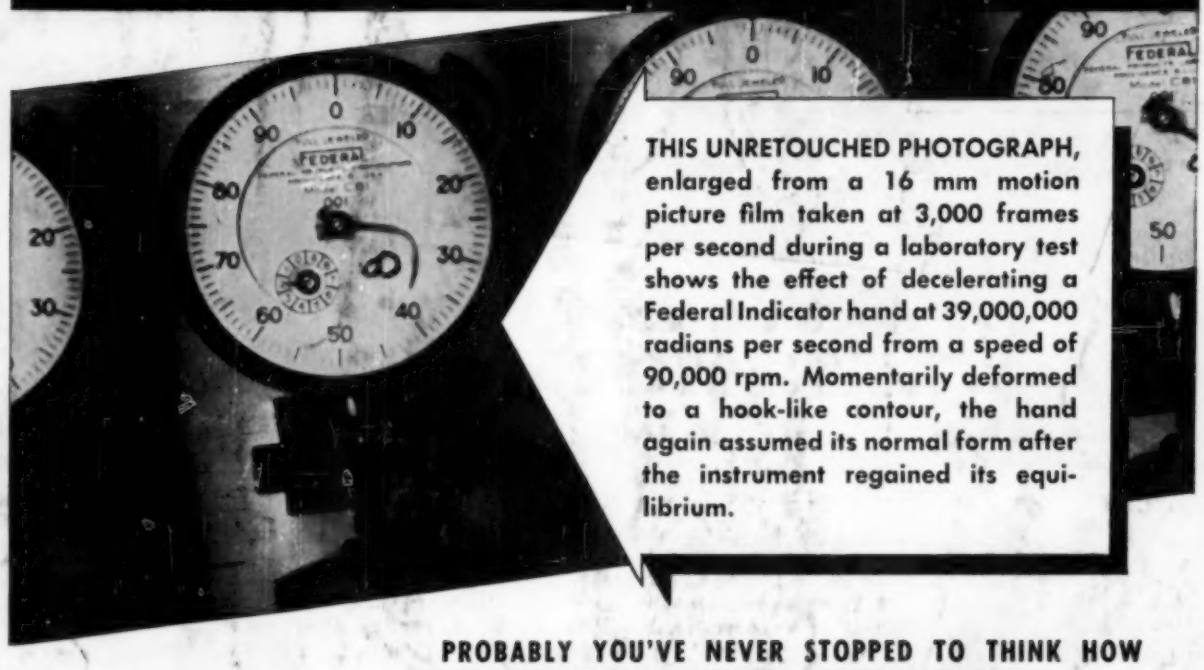
NAME_____ TITLE_____

COMPANY_____

STREET_____

CITY_____ STATE_____

What this test means to YOU!



THIS UNRETOUCHED PHOTOGRAPH, enlarged from a 16 mm motion picture film taken at 3,000 frames per second during a laboratory test shows the effect of decelerating a Federal Indicator hand at 39,000,000 radians per second from a speed of 90,000 rpm. Momentarily deformed to a hook-like contour, the hand again assumed its normal form after the instrument regained its equilibrium.

PROBABLY YOU'VE NEVER STOPPED TO THINK HOW IMPORTANT AN INDICATOR HAND CAN BE...

IT IS NOT JUST CONVENTIONAL MODERN DESIGN that makes the hand on a Federal Dial Indicator look as it does!

This high-speed movie shows one of thousands of tests made in our laboratory in a constant effort TO PRODUCE THE FINEST POSSIBLE DIAL INDICATORS FOR YOU. In this destructive test the hand has been momentarily deformed by an excessive blow on the Indicator's contact point.

You naturally ask why we don't just make a stiffer hand. The answer is that a *heavier* hand would increase the inertia and friction within the Indicator and decrease its sensitivity and accuracy. A *lighter* hand would have less inertia but it would not recover its normal straightness after extreme operating conditions. The hand of a Federal Dial Indicator MAINTAINS ITS NORMAL SHAPE.

Furthermore, the hand on a Federal Dial Indicator IS STATICALLY BALANCED to assure a CONSISTENT GAGING PRESSURE against the workpiece. You get a more sensitive Indicator of GREATER REPETITIVE ACCURACY.

This kind of detailed research is typical of the great care that goes into the design and improvement of Federal Dial Indicators and helps to explain WHY FEDERAL IS THE WORLD'S LEADING MANUFACTURER OF DIAL INDICATORS.

It is also very much worth noting that modern manufacturing techniques and Modern Quality Control have enabled us to sell Federal Dial Indicators AT THE SAME LOW PRICE FOR FIFTEEN YEARS. If you haven't our latest catalog showing the most complete line of Dial Indicators of all styles and sizes, write Federal Products Corporation, 5151 Eddy St., Providence 1, R. I.

FEDERAL

Largest manufacturer devoted exclusively to designing and manufacturing *all types* of DIMENSIONAL *INDICATING* GAGES

EUGENE B POWER
UNIV MICROFILMS
313 N FIRST ST
ANN ARBOR MICH